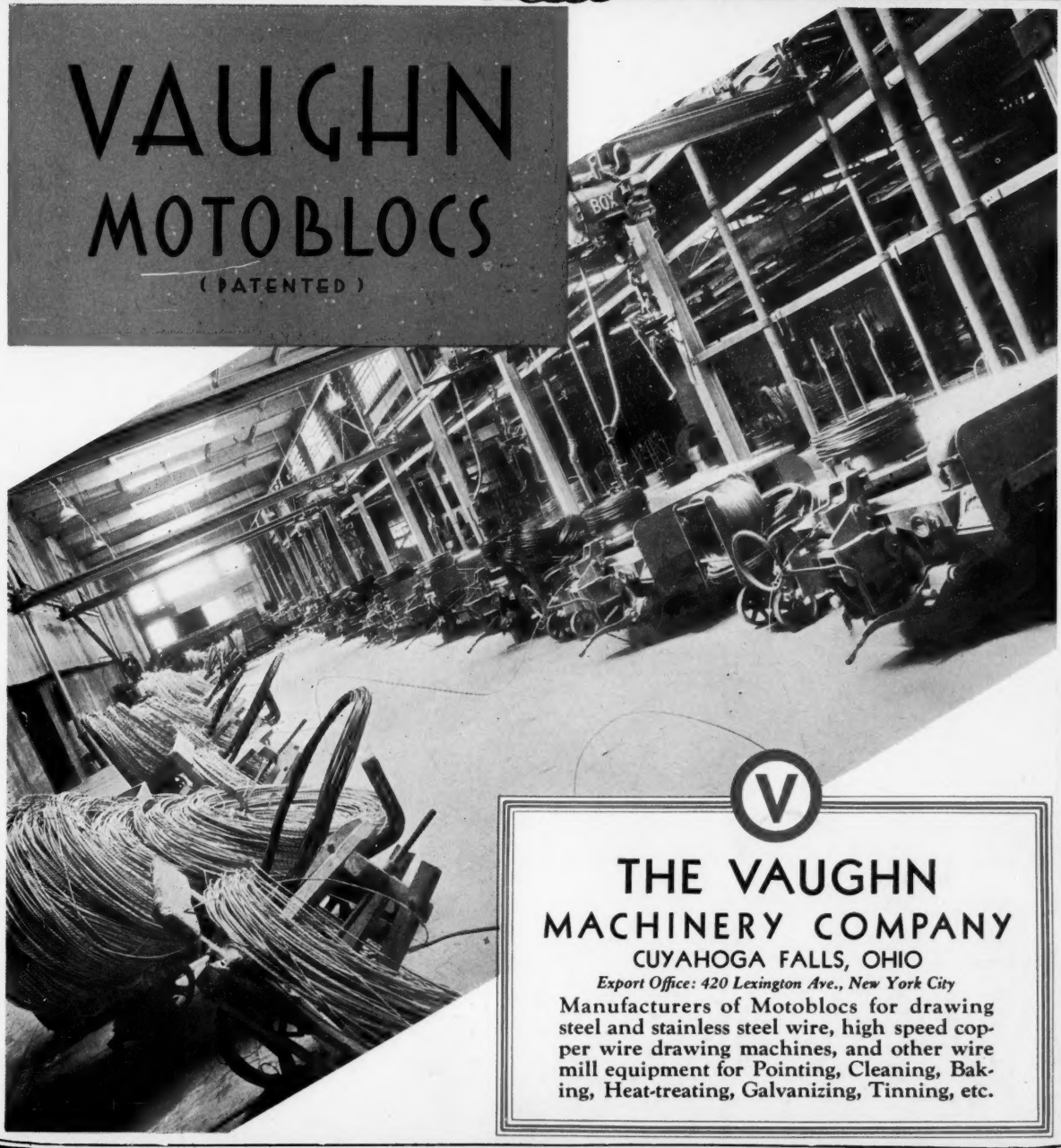
WIRE & WIRE PRODUCTS

OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION

VAUGHN
MOTOBLOCS
(PATENTED)



THE VAUGHN
MACHINERY COMPANY
CUYAHOGA FALLS, OHIO
Export Office: 420 Lexington Ave., New York City
Manufacturers of Motoblocs for drawing steel and stainless steel wire, high speed copper wire drawing machines, and other wire mill equipment for Pointing, Cleaning, Baking, Heat-treating, Galvanizing, Tinning, etc.

June 1931

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Each CARBOLOY die is built to give the maximum efficiency obtainable from the amount of CARBOLOY used.

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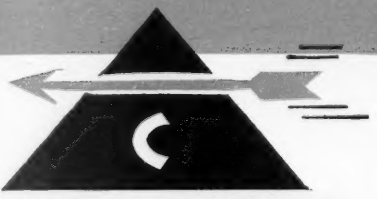

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Look for the mark of Carboloy:—if the mark is not on the product it is not a Carboloy cemented tungsten carbide product.

Speed Production with

— **CARBOLOY** —

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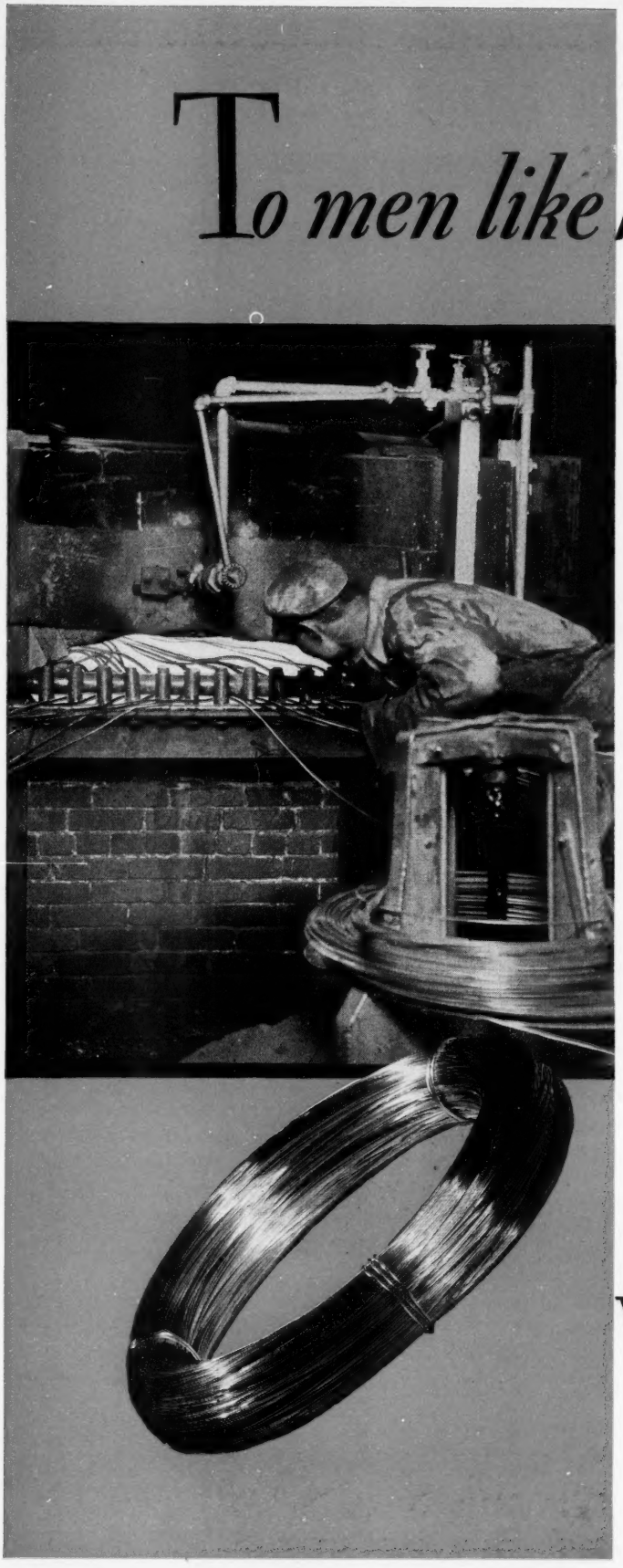

To men like him GOOD WIRE is religion

EVEN though all our furnaces are automatically controlled by recording pyrometers, these men, many of them trained as boys in our plants by their own fathers and in some cases their grandfathers, still feel the same old satisfaction at seeing wire "take the color". Their faithful following of scientifically planned instructions and skillful handling of work in process all contribute to the quality and uniformity of Wissco Wire.

●

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Pacific Coast Headquarters: **San Francisco**
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NEW ENGLAND BUTT

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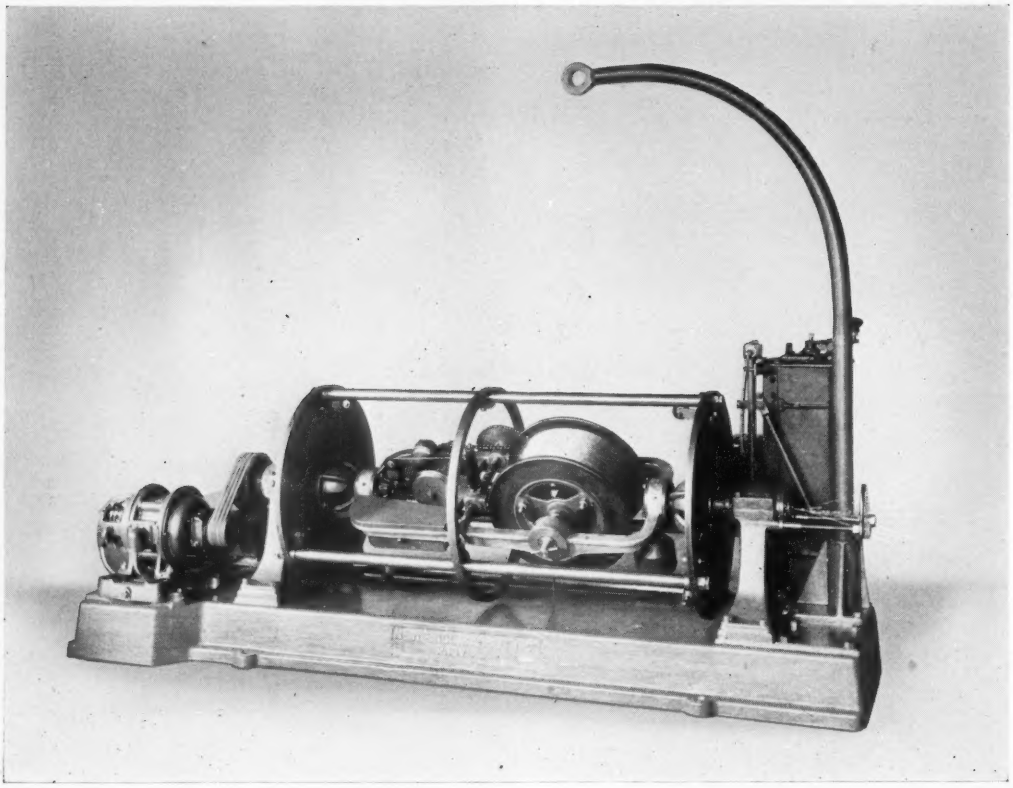

This new buncher has been developed to give greater flexibility to the operation of bunching. It runs at a speed of 900 r. p. m. and will produce 4500 to 36,000 feet of wire per hour. It is completely mounted and can be easily moved to various locations in the plant. The machine is geared to make two twists to one revolution of the motor, producing 1800 twists per minute. The reel is 19″ in diameter by 8″ traverse, having a capacity of 350 pounds. Change gears are furnished to give lays from ½″ to 2″ in ¼″ step.

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NEW ENGLAND BUTT COMPANY

DEPT. W-6, PROVIDENCE, R. I.

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WIRE & WIRE PRODUCTS, Vol. 6, No. 6, June, 1931. Executive office, 551 Fifth Avenue, New York, N. Y. Published by the Quinn-Brown Publishing Corp., Richard E. Brown, President; R. S. Spengel, Secretary and Treasurer. Publication office, 49 E. Washington Ave., Washington, N. J. Subscription price: U. S. and Canada, $5.00 per year, 50 cents per copy; Foreign, $7.50 per year. Entered as second class mail at the Post Office, Washington, N. J., under Act of March, 1879. Copyright, 1931, by Quinn-Brown Publishing Corp.

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THE HADDOW
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In Operation at the Wire Show at Cleveland, O., June 15th to 19th

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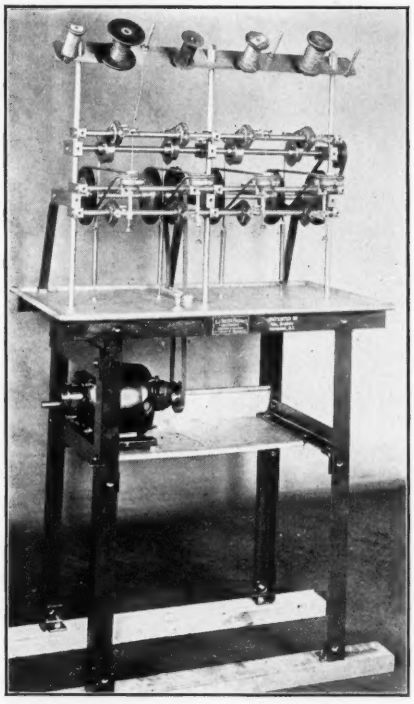

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Bring Some Small Worn Dies
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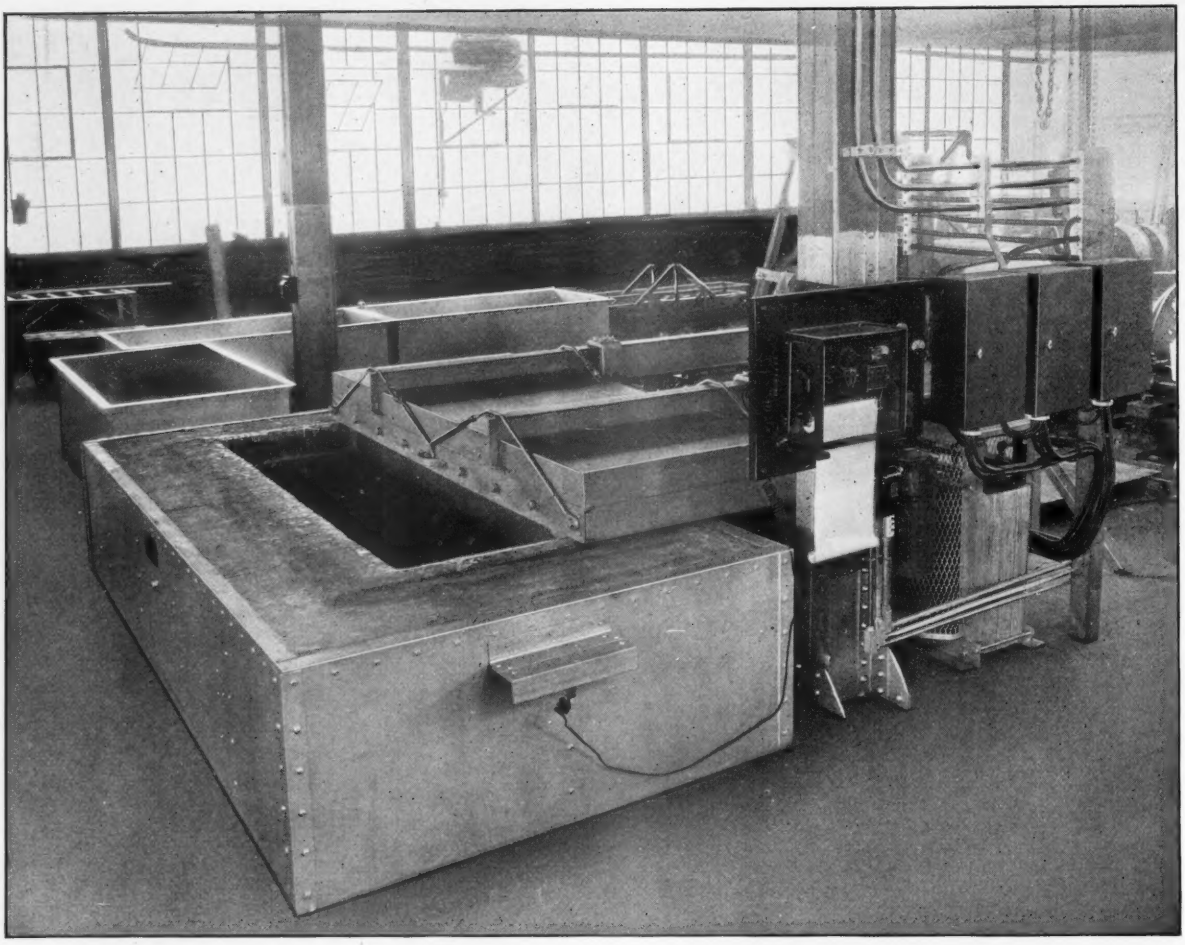

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No heating elements to burn out.

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All the heat in the bath; no excess temperature necessary to drive the heat thru the pot.

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Get ready for the good times to come.

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Are you receiving the best that can be had for your money?

THEN

Let us go over your die problems with you.

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Individual attention given to your particular requirements.

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Let us talk over our work with you.

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Bell Mine Products
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"Bell-Mine" Rotary Kiln Pulverized Lime is burned by gas flame in rotary kilns from deep mined stone from the famous Bellefonte High Calcium Vein.

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D R I N O X

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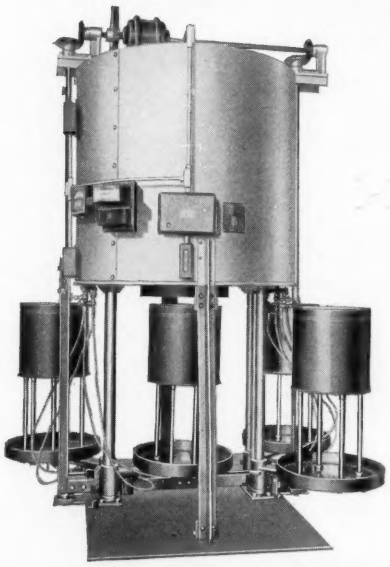
Dry Bright Annealing Non-Ferrous Metals

Particularly for those metals so formed that they are preferably kept dry during the cooling period immediately following the heat treatment

FINE WIRE, SPOOLED OR COILED, HOLLOW WARE, SHELLS, ETC.



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Requires no foundation, is self-contained and may be located in the line of production.

Gives laboratory results in commercial quantities.

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FOR 39 YEARS

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In all metals and alloys and with all kinds of dies.

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EACH DESIGNED FOR A SPECIAL PURPOSE!

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Olive—In cakes and cubes for wire rope.

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Waterbury Brand—For wet drawing, supplied solid in barrels 300 lb. weight.

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Specialists in Wire Drawing Soap Since 1892.

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UWDC
UN-WIDIA DIES

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You are invited to see these dies at our exhibit at the Wire Show, Cleveland, Ohio, June 15-19.

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NEW YORK

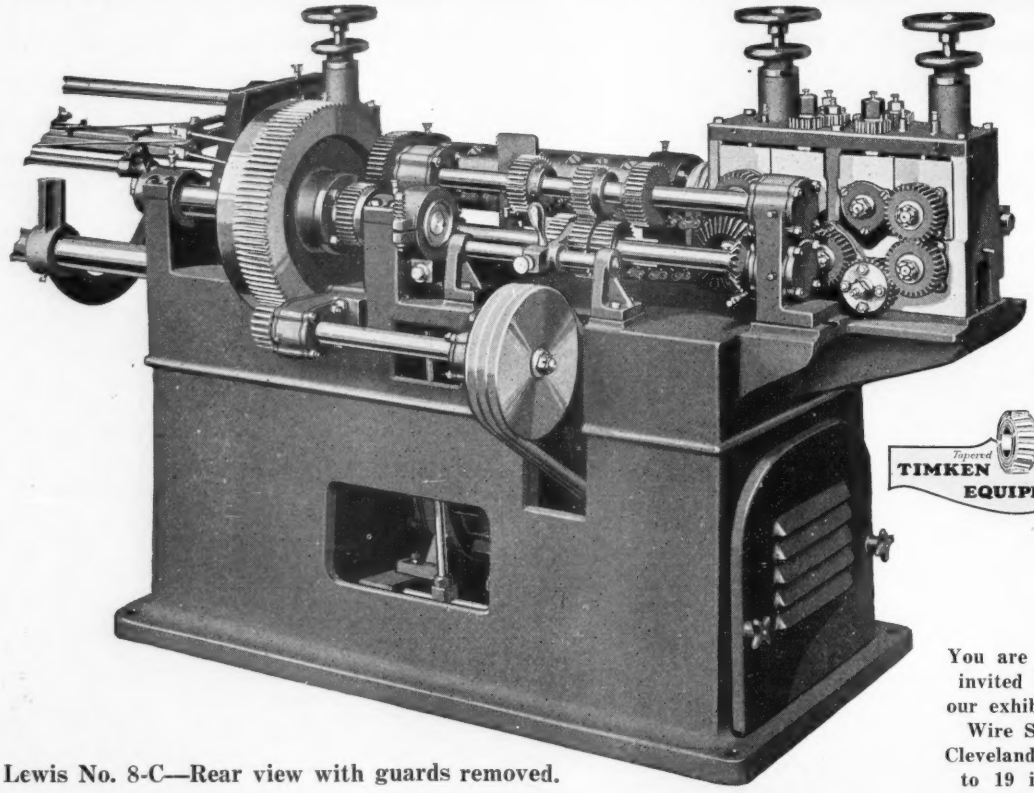
Over 100 WELDING RODS PER MINUTE

✦ 14" Lengths ✦

LEWIS

(WITH THE NEW)

LEWIS WIRE STRAIGHTENING and CUTTING MACHINE



Tapered Roller TIMKEN BEARING EQUIPPED

Lewis No. 8-C—Rear view with guards removed.

You are cordially invited to visit our exhibit at the Wire Show at Cleveland, June 15 to 19 inclusive

SPECIAL FEATURES

HIGH SPEED CUT-OFF—THREE SPEED TRANSMISSION

30 TIMKEN ROLLER BEARINGS — BUILT-IN V BELT MOTOR DRIVE

WRITE FOR COMPLETE INFORMATION ON THIS MACHINE

THE LEWIS MACHINE COMPANY

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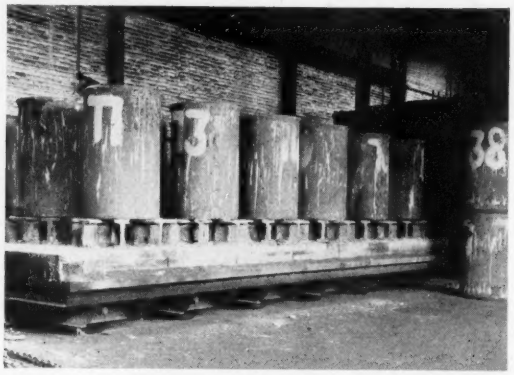
Columbiana Annealing Pots

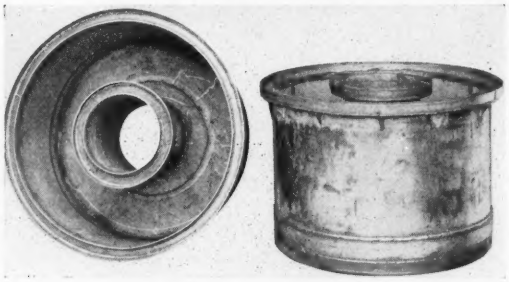
Designed to fit your special needs

Forge Hammer Welded Wire Pots



Pots of this type can be furnished in any practical size, shape, or thickness of material; with either flared or belled offsets at top and with or without lifting holes.

Light Gauge Heat Resisting Alloy Wire Annealing Pots



This type of pot is replacing cast equipment and has already passed through the experimental stage. This Pot has many advantages in the Annealing of coiled strip, wire, small forgings, stampings, etc.

Light Gauge Heat Resisting Alloy Wire or Strip Covers

Any grade or type of Alloy can be furnished in these covers. Our Engineers will be glad to recommend grades suitable for your needs. The covers can be arranged for either top or bottom sealing. If you desire years of service, these covers will interest you.

Our Facilities and More Than 35 Years of Specialized Experience in this Line, Enable us to Meet Your Requirements as to Size, Shape and Thickness of Equipment which Will Be Best Suited to Your Needs.

ANNEALING POTS AND PANS
GALVANIZING POTS AND KETTLES
LEAD MELTING POTS
SALT ANNEALING POTS

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The Columbiana Boiler Company

209 West R. R. Street — COLUMBIANA, OHIO

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THEY ARE 1931 MODELS DESIGNED TO MEET THE PRODUCTION REQUIREMENTS OF 1931 CONDITIONS

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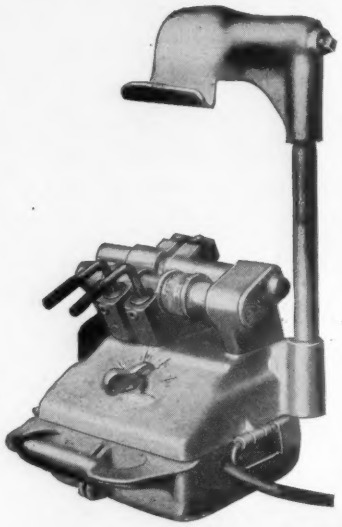

The original "MICRO-WELD" (Model E) that perfectly butt-welds wires from No. 4 to No. 20 gauge. Micrometer-precision makes this possible. Its capacity is 2½ kw, and it is available on a truck if wished.

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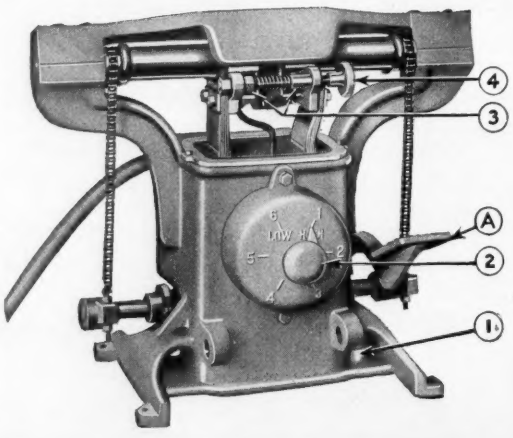

For further information on these or other MICRO-WELD products address

Micro Products Company

140 Industrial Street **Peoria, Illinois**

European Office: H. A. Schlatter & Co., Zurich 1, Limmatquai 32, Switzerland

WIRE & WIRE PRODUCTS

A monthly publication devoted to the production of Wire & Wire Products in all metals from the bar to the finished wire product.

Vol. 6 June 1931 No. 6

Official Publication of The Wire Association

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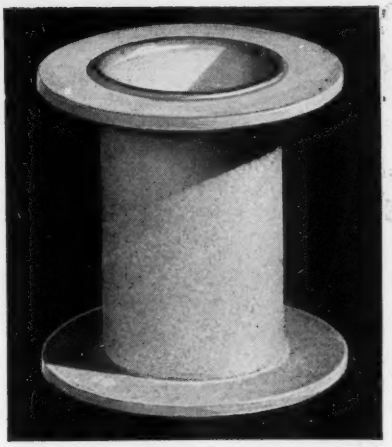

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GENUINE WIDIA METAL ONLY

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You are invited to see these dies at our exhibit at the Wire Show, Cleveland, Ohio, June 15-19.

WIRE & WIRE PRODUCTS

A Monthly Publication Devoted to the Production of Wire and Wire Products in all Metals from the Bar to the Finished Wire Product.

Vol. 6 JUNE, 1931 No. 6

X-Ray Application to Wire and Wire Products

by Norman P. Goss

Special Research Assistant

X-Ray Laboratory—Dept. of Chemistry, University of Illinois

This paper was written with one idea in mind, to show the metallurgical engineer, who is interested in wire and wire products, the practical value and possibilities of X-ray diffraction methods.

THE metallurgist in studying ing the structure of various kinds of wires and wire products, finds in a great number of instances that two materials which apparently have the same chemical and physical analysis behave differently in service. This is especially so in the case of forming wire, or in materials subjected to deep drawing. When sheet brass or aluminum in the annealed state are deep drawn, some of the formed sheets develop ears, while others will not develop ears during the deep drawing operation, yet these sheets will have about the same physical characteristics, such as tensile strength, hardness, ductility and grain size. In examining these materials with the X-ray the ones which developed ears during the forming operation produce X-ray diffraction patterns which show the grains to have directional characteristics, while the materials which deep draw without ears always disclose X-ray patterns which show the grains to be distributed at random.

Figure I is an X-ray diffraction pattern of sheet aluminum which

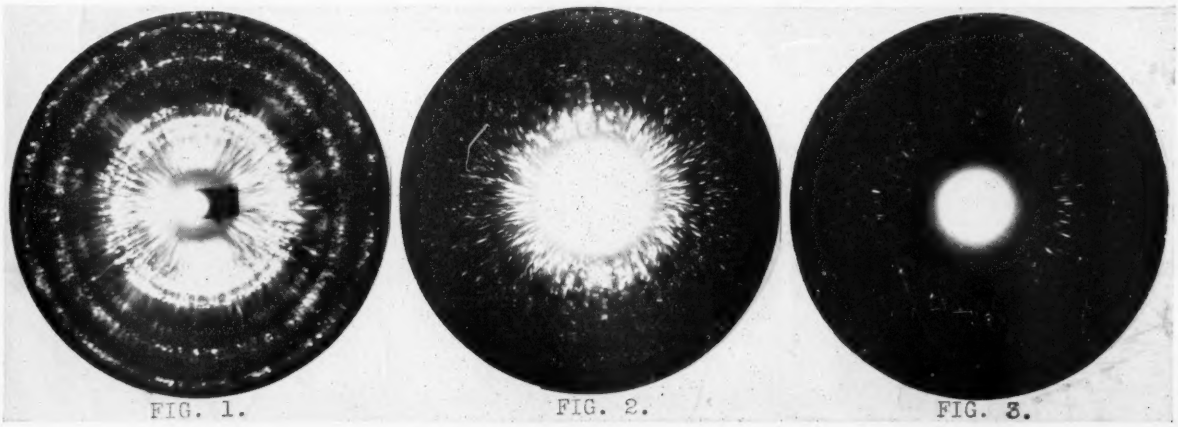

Figure 1.
Sheet aluminum which developed ears during forming operation. This spectrogram shows the grains to lack random distribution. ✦

Figure 2.
Low carbon steel in the annealed condition.

Figure 3.
The same low carbon steel wire shown in Figure 2 except that the specimen was bent several times through the small angle and thereby fragmented the grains. ✦ ✦

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TEST YOUR DIES BEFORE USING! THE MASTER DIE TEST INSTRUMENTS ENABLE YOU TO CHECK EVERY DIE BEFORE YOU USE IT!

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YOU ARE CORDIALLY INVITED TO SEE OUR EXHIBIT, BOOTH 39; AT THE WIRE SHOW, CLEVELAND, O., JUNE 15-19.

MASTER

WIRE DIE CORPORATION

408 Concord Ave., New York

developed ears when cupped. It shows that the grains are not distributed at random, but are oriented in a definite direction. When such a grain structure is deep drawn, plastic deformation will occur with greater ease in certain definite directions due to the fact that the grains are not distributed at random. The amazing fact revealed by this particular diffraction pattern is that the directional characteristics of the grains is not marked yet this material developed ears during the deep drawing operation.

grain structure of steel is shown in Figs. 2 and 3. Figure 2 is the X-ray diffraction pattern of a steel wire in the so-called annealed condition, (commercial anneal), but as we shall see later, it is far from what might be considered an ideal annealing structure. The specimen used to make this X-ray pattern was bent back and forth several times, through a small angle, and Figure 3 shows the result. The grains are extremely distorted and fragmented. These two X-ray diffraction patterns show that annealed materials which are to be

meant by a thoroughly annealed material. Figure 4 is an X-ray diffraction pattern of sheet steel perfectly annealed because here the grains are free of grain distortion and upon close examination the K lines are seen to be completely resolved. This means that the grains are nearly perfect in structure, distributed at random, and uniform in size.

AT one time it was a common belief among mill men that large grained materials were brittle but this is not so as the author obtained single crystals in the form of

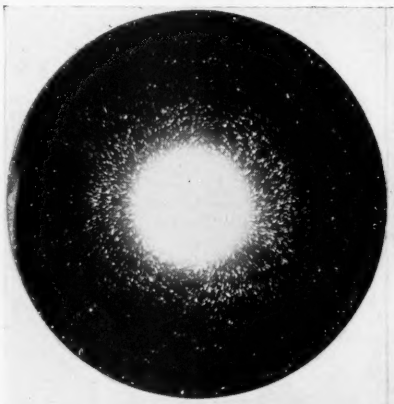

FIG. 4.

Figure 4.
X-ray diffraction pattern of a low carbon steel wire in which the grains were found to be nearly perfect in structure. ✦ ✦ ✦

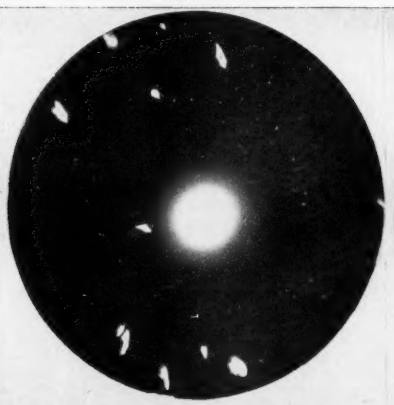

FIG. 5.

Figure 5.
X-ray diffraction pattern of large grain Armco Ingot Iron. The spectrogram shows that the grains are nearly perfect in structure. ✦

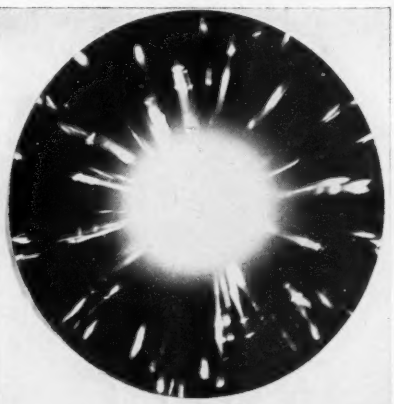

FIG. 6.

Figure 6.
Another X-ray diffraction pattern of large grain Armco Ingot Iron showing distorted grains. ✦ ✦ ✦ ✦ ✦

THIS information immediately tells the metallurgist that the material must be cold worked and heat treated so as to produce a structure in which the grains are distributed at random. Another consideration other than grain distribution which is also of great importance is **grain distortion.** Metal sheets which are to be used for deep drawing should not only have random grain distribution but the grains should be free of distortion, since distorted grains do not have as great a capacity for cold work as grain free of distortion.

The X-ray diffraction pattern shown in Figure I shows that the grains are quite distorted and this is indicated by the "radial striations", meaning that the crystal surfaces are bent or warped due to strains set up between the grains during the annealing operation.

The effect of bending on the cold worked in making wire products should be handled with extreme care as slight deformations produce a surprising amount of grain fragmentation, meaning that the grains will have a much lower capacity for additional cold work. This is especially true when such a material is to be used for deep drawing.

IT is usually considered that heating a material and cooling it slowly will completely anneal the material in the sense that it has low tensile strength, great ductility, low hardness value, etc. In other words, the material is now in a condition to stand a large amount of cold working as the grains are capable of absorbing energy in the form of cold work. However, such physical characteristics tell us nothing about the internal structure of the grains. The next group of X-ray diffraction patterns will show just what is

flat strips from Mr. Lawrence Ott (Western Reserve University). They were extremely ductile and could be twisted into knots and untwisted several times before failure occurred. This proved that large grains are not necessarily brittle as formerly believed. Figure 5 is the X-ray diffraction pattern of such a crystal. This particular grain was nearly free of grain distortion. Figure 6 is the X-ray diffraction pattern of some of the same material but the grains were all found to be extremely distorted. The physical properties of these two large grain pure iron wires were about the same, but the one having the strained grains does not have nearly as great capacity for cold working as the ones which were free of distortion. Here again the X-ray can aid the metallurgist in determining the proper mechanical and heat treatment necessary to pro-

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duce a large grain material free of grain distortion and of great ductility. The chemical composition must be taken into consideration as all large grain materials are not necessarily ductile, but in the case of nearly pure iron, it is possible to produce a very ductile strip.

Figure 7 is an X-ray diffraction pattern of round low carbon steel wire in the annealed condition. (Commercial) The grains are far from perfect, some are rather large, and some are in a fragmented state. The "radial striations" mean that the grains are distorted.

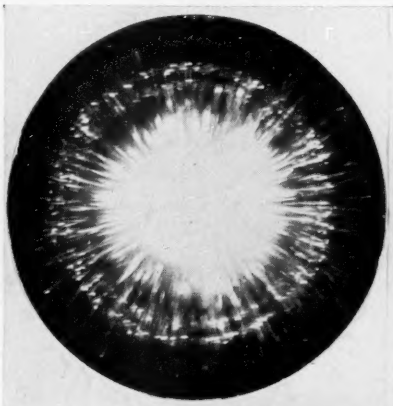


FIG. 7.

Figure 7.
X-ray diffraction pattern of a low carbon commercial annealed steel rod. ✦ ✦

FIG. 8.

Figure 8.
X-ray diffraction pattern of a wire drafted 99½%. ✦ ✦ ✦ ✦ ✦ ✦

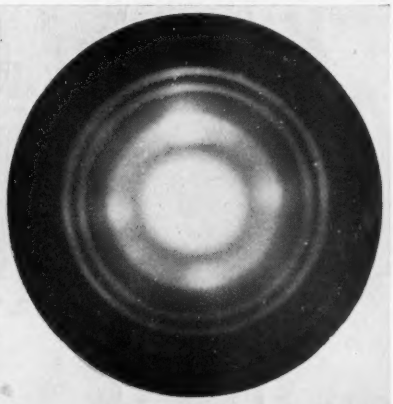


FIG. 9.

Figure 9.
X-ray diffraction pattern of a hard rolled flat wire. ✦ ✦ ✦ ✦ ✦ ✦

Such material, although capable of great area reductions, is not capable of standing a great deal of bending. A greater capacity for bending is possible as the grains become more perfect in structure, as shown in Figure 4. The wire, the structure of which is shown in Figure 7 was given an area reduction of 99½% and the spectrogram obtained from this drafted wire is shown in Figure 8. It discloses the fact that this wire could still be given greater area reductions, and it also tells us that the fiber structure developed by the cold drawing operation has caused the (110) of planes of the grain fragments to tend to set themselves along the wire drawing direction.

It was also found that the grain size of annealed material effects the fiber pattern of the cold worked material. Figure 9 is the X-ray diffraction pattern of a hard rolled flat wire. It shows that the (110) of the grains tend to lie in the direction of rolling and the (100) tend to lie in the rolling surface. That is the reason flat wire produces a so-called 4 spot pattern as against the 6 spot pattern of the round wire in which the (110) also lies in the direction of drawing, but due to the fact that the (100) planes tend to lie on a cylindrical surface instead of a flat one, then, of course, the (110) planes are considered to be distributed at random about the wire axis. Figure 9 shows that when we start with a fine grained steel in the annealed condition, then on cold rolling it a fiber structure is produced in which the (110) tends to lie in the direction of rolling and the (100) tend to lie in the surface of the wire or the rolling plane. Is this type of fiber structure produced when a large grained material is cold rolled the same amount? In the next case a steel of low carbon content and composed of extremely large grains was given an area reduction of 80% and an X-ray diffraction spectrogram taken. Instead of obtaining the regular four spot fiber pattern characteristic of a cold rolled structure, a six spot fiber pattern was obtained and this is due to the large grains. It was found in previous experiments that large grains are capable of resisting cold deformation in a much better way than small grained steel wires; as it takes a larger amount of cold work to fragment large grains. The X-ray diffraction pattern of this large grained flat wire which was cold rolled 80% is shown in Figure 10. Due to the fact that we have a six spot fiber pattern instead of a four fiber pattern means that the grains tend to be distributed at random about the (110), and perhaps another set of (110) planes set to lie in the rolling plane, but additional experimental work is necessary in order to definitely prove or disprove this assumption. The point that interests the metallurgists is not the type of X-ray pattern, but that X-rays show that large grains have a greater capacity for cold work than small grained materials. The practical significance is this, for a certain type of deep drawing operation, a certain range of grain

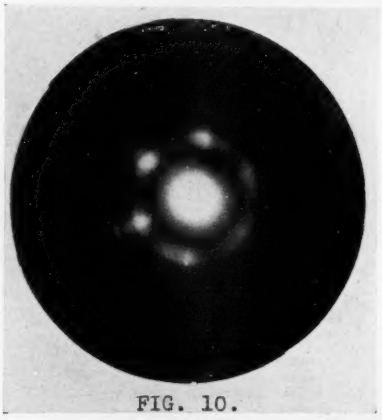


FIG. 10.

Figure 10.
An X-ray diffraction pattern of a rolled structure developed when a low carbon steel strip in which the grains are extremely large is given an area reduction of 80% ✦ ✦ ✦ ✦ ✦

(*Please turn to page 251*)

Fundamentals of Copper Wire Annealing

By O. S. Haskell
General Electric Company
Schenectady, N. Y.

Results of Experiments to Determine Furnace Best Suited to Meet Copper Wire Annealing Requirements of General Electric Company

THE annealing of copper wire means, to the modern manufacturer a clean non-oxidized product requiring no pickling or wiping; it also means a product which if annealed on spools or reels will require no rewinding process. It must also be a uniformly annealed product, and the softness of the finished wire must be exactly controllable.

The temperature can be controlled more accurately in a well designed electric furnace than in any other furnace. The tons of wire used in the many General Electric products are annealed by electric heat.

The problem as to the design of the furnace best suited to the work has been solved most satisfactorily for real production purposes.

To assure uniformity of product the heating processes should be uniform from the original billet from which the rod is made, to the finish anneal. However, for the purposes of this article we shall consider only the finish anneal.

The finished copper wire varies in size from 2.5 mils diameter to one quarter inch for round wire. Then some wire, rectangular in cross section is produced. Some of the wire is annealed in coils; some on spools and bobbins.

Selection of Furnaces

AFTER years of experience in the annealing operation, two types of furnaces are now in use and cover the entire range of wire sizes. These are the hood type shown in Figure 1, and the water seal elevator type shown in Figure 2.

The method of arriving at this decision in furnace design will be of interest. The goals to be achieved were:

(1) Uniformity of anneal
(2) Economy of annealing operation.

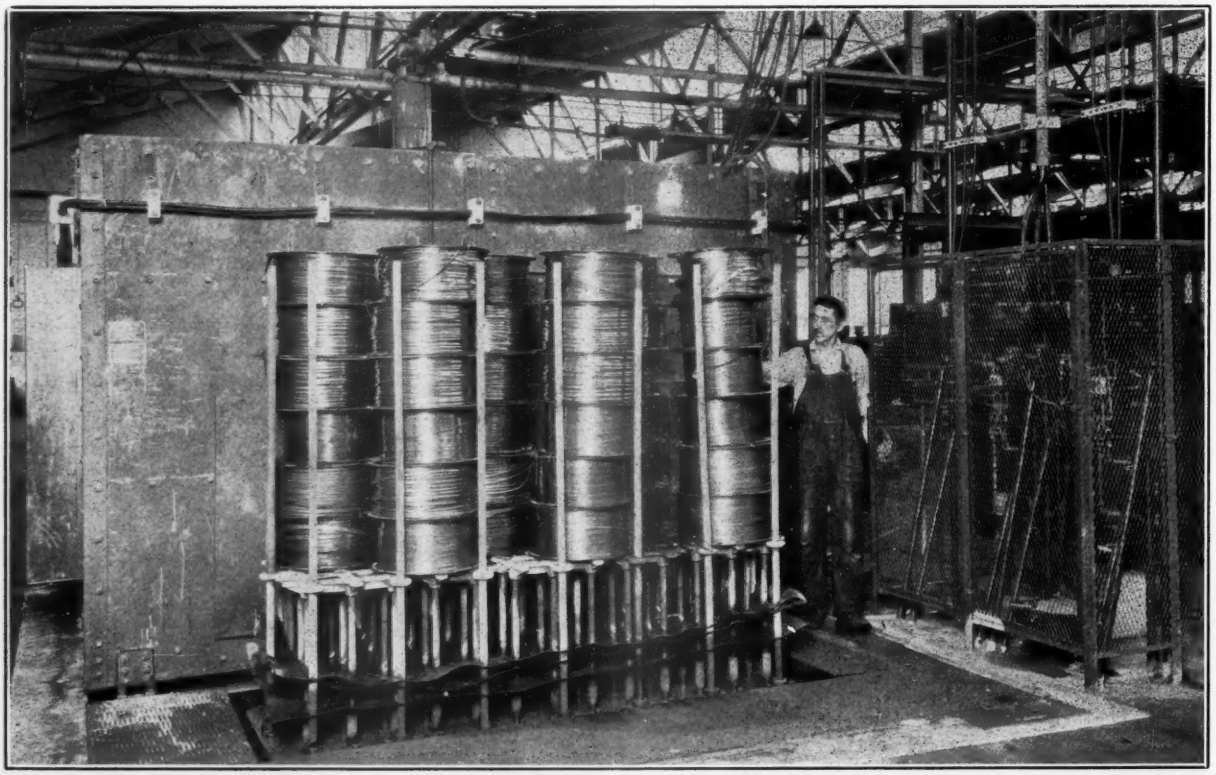


Fig. 2. Kenworthy Electric Furnace for bright annealing copper wire. Heating chamber 4½′ x 9½′ x 6″ High. Charge 10,000 lbs. General Electric Company, Schenectady, N. Y.

(3) Doing away with unnecessary labor and processes after annealing.

IN dealing with the first problem of a uniform anneal, the first requisite of uniform furnace temperature was demonstrated to be assured with the electric furnace. In designing the furnace, a choice had to be made between the batch type furnace annealing large loads at a time, and the continuous or single strand annealing furnace. The continuous furnace was found to give a uniform anneal with intelligent and painstaking operation and it was also demonstrated that the batch type furnace would also bring uniform results.

So the problem progressed to the second step of economy of operation. Here the primary requisites were maximum poundage per day, cost of power, and labor of operation.

Consider very small wire, taking 6.3 mil wire for example. This wire weighs only .12 of a pound per 1000 linear feet. Suppose we have a continuous furnace allowing for a maximum of fifty strands to pass continuously through the furnace. The average rate for this size wire was believed to average not more than 200 feet per minute for a 24-hour day. The amount of wire possible to anneal in such a furnace will be then:—

$$\frac{.12 \text{ lbs.} \times 50 \text{ strands} \times 200 \text{ ft. per min.} \times 1440 \text{ min. per day}}{1000 \text{ ft.}} = 1728 \text{ pounds per day.}$$

Continuous Furnace

THIS furnace including the reeling equipment would cover a floor space approximately 40 ft. long by 8 ft. wide. The difficulty of threading the wire through such a furnace, keeping the exact tension on the wire, as well as putting on new reels and removing finished coils, would probably require the constant attention of two men. Breakdowns in such an equipment were likely as it is somewhat intricate. However, the work could be done with a clean uniform anneal and no further work would be required.

Batch Type Furnace

NOW the batch type furnace was considered. With a loading capacity for 1500 pounds net of 6.3 mil wire it was found that the electric furnace would heat the charge in 4½ hours, at the proper annealing temperature to assure a uniform anneal. This would allow for 5 1/3 charges per day of 24 hours with a maximum poundage of 8000 lbs. per day. The loading and unloading required but one operator, with no attention during the heating or cooling cycle. The operator could even be used for other work part time. The wire was clean and uniform in anneal and required no further processing.

From the above it can be seen why the batch type furnace was chosen for small size wire. This is not an argument, however, against the use of the continuous furnace as the General Electric Company builds and uses them on many other applications to advantage, and for reasons equally as good as those for not using them in this instance.

Now a decision had to be made as to the design of the batch type furnace. Two designs were decided upon and are now operating with marked success: the electric hood type furnace shown in Figure 1 and the water-seal ele-

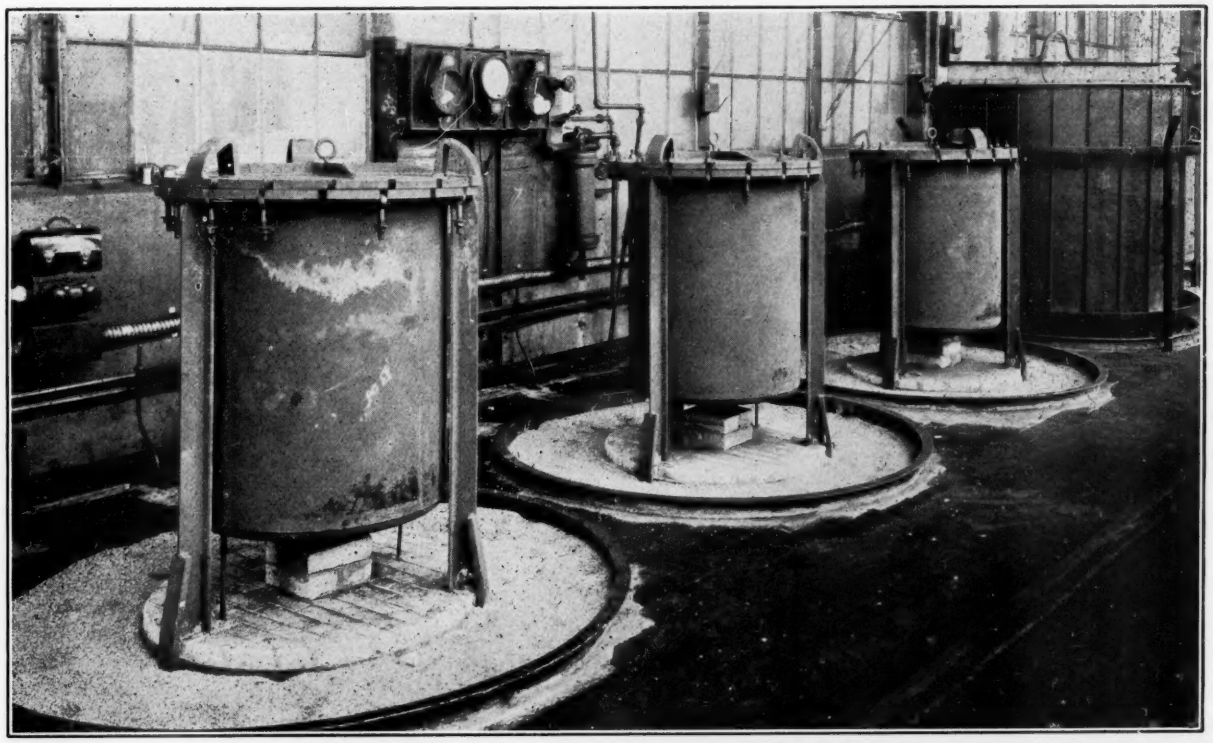


Fig. 1. G-E Electric furnace with group of retorts for bright-annealing.

vator type electric furnace shown in Figure 2.

Operation of Hood Furnaces

THE complete equipment partially shown in Figure 1 comprises two hood shaped electric furnaces and ten retorts. The retorts are all permanently placed while the furnace is moved from one to another by means of an overhead crane making the operation continuous. The cycle of operation is as follows: a charge of wire averaging from 1500-1800 lbs. net wire, varying with the size of wire, is loaded into any one of the retorts. The gas tight cover is put on and the retort is purged of air through permanent gas connections. Pure nigrogen, a mixed gas composed of nitrogen and hydrogen and steam and city gas have been successfully used for this operation. The furnace is then lowered over the retort to remain there until the end of the heating cycle, when the furnace is transferred over another load in another retort. The load in the first retort is left to cool in the retort until it arrives at a non-oxidizing temperature.

Production Data

THE complete production data for this type of furnace as in operation in this plant is given in Table 1.

The heating times given in Table I can be decreased but it will be found that for excellent results the times given should be used with low temperatures. On the smaller sizes the elongation for the times given will average between 26-30% in 10 inches. For the larger sizes from 30-37% in 10 inches. If other elongations are desired they can be obtained by use of different temperatures, varying lengths of heating cycle.

TABLE I
Hood Shaped Furnace

Size Wire	Units per load	Type & Size Units	Lbs. per Load	Loads per Day (Two Furnaces)
.003—.008	500	2¾"x3½" Spools	1500	10
.008—.0126	143	2¾"x6" Spools	1800	9
.014—.023	104	4¼"x6" Spools	1600	9
.024—.049	35	4¼"x10" Spools	1600	9

Heating Cycle	Economy
4½ hours	21# per Kwhr.
5 hours	22# per Kwhr.
5 hours	22# per Kwhr.
5 hours	22# per Kwhr.

*Based on overall production with heating up after cooling over week-end.

The data given will also produce non-sticky wire on spools requiring no rewinding, whereas, higher temperatures and shorter cycles will result in sticky wire.

Operation of Kenworthy Furnaces

THE water sealed electric Kenworthy furnace as shown in Figure 2 is operated as follows:

The load is placed on the elevator as shown in the figure. A similar load is inside the furnace at the end of the heating cycle, the elevator in the furnace, as well as the one shown with the load, are lowered into the water. The furnace is then transferred by a driving mechanism to a position over the new load which is elevated with the furnace. The load which has just come out is elevated on the opposite side for unloading.

WHEN the furnace is started up the air is purged from the furnace with dry steam and an atmosphere of steam maintained during the heating cycle.

This furnace operates with large capacity, and is loaded and controlled by a single operator.

The economy of the furnace will vary from 16-22 lbs. per Kwhr. varying with the size wire and method of loading.

Production data are as shown in Table 2.

OTHER furnaces used in this wire mill are enameling furnaces and tinning baths. Both of these processes require careful and accurate temperature control for a good product. The smaller sizes of wire in each case are annealed at the same time that the enamel or tin is applied. For larger sizes, because of high speeds necessary for economy, the wire requires a partial anneal which is accomplished in lesser cycles in the two types of electric furnaces shown here.

Table 2.
Kenworthy Furnace

Size Wire	Units per load	Type & Size Units	Lbs. per Load	Loads Per Day
.020—.045"	180	10" Spools	8100	10
.045 x .060"	36	22" Coils	7900	10
.061 & larger	36	22" Coils	7900	12
.061 & larger	36	16" Bobbins	7200	11
Rectangular	36	19"x8½" Reels	7900	10

Hours Per Day	Temperature	Time to Heat
24	500 Degrees C.	2 hours
24	500 Degrees C.	2 hours
24	625 Degrees C.	1½—1¾ hours
24	625 Degrees C.	1¾ hours
24	625 Degrees C.	1¾—2¼ hours

All technical papers presented at the Wire Association meeting in Cleveland, together with the discussions, will be published in WIRE AND WIRE PRODUCTS in July and subsequent issues.

These papers and discussions give live up-to-date information on processes of production and will be of interest to every man engaged in the manufacture of wire and wire products.

A Pure Zinc Galvanizing Process

By L. D. Whitehead
Whitehead, Hill & Co., Ltd., Cwmbran, Mon. England

The first paper of a discussion on
HOT GALVANIZING VS. ELECTRO GALVANIZING
between Mr. L. D. Whitehead of Whitehead, Hill & Co., Ltd.,
and Mr. G. K. Rylands of Rylands Brothers, Ltd.

We have requested Mr. W. H. Spowers, Jr., well known consultant on galvanizing and Associate Editor of Wire and Wire Products to review this controversy upon its conclusion.

Mr. Spowers states that this is one of the most interesting debates that he has read for some time and urges our readers to hold the installments for reference as they proceed.

IN the past four years a great deal of research work has been carried out with a view to improving the corrosion-resisting qualities of galvanising as applied to iron and steel wire and strip. The necessity for this improvement in quality arises from the uses to which galvanized wire is being applied.

IT is being largely used in the armouring of electric cables, in the manufacture of wire hawsers and ropes for marine work and for many other purposes in which the quality of the galvanising against corrosion has become of first importance owing to the great value of the materials it has to protect.

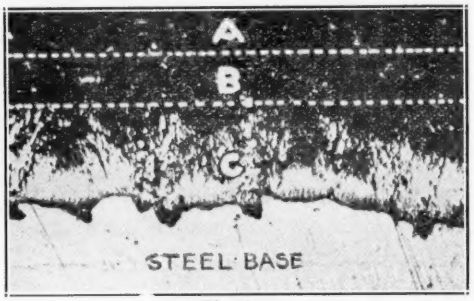


Fig. 1.

THE system which has so far been what is known as the Hot Process, in which the article to be galvanised passes through a bath of molten zinc. In galvanising, the value of the coating as a preventive of corrosion is directly dependent on the degree of purity of the zinc in that coating, and its firm adherence to the base metal. Unfortunately, zinc in its molten state has a strong affinity for iron, and, consequently, in the hot process it becomes contaminated, firstly by contact with the sides of the hot bath, and, secondly, from the wire or strip which is being galvanised. In the United States, various methods have been adopted for reducing this serious defect in the hot galvanising process, and in recent years some of these improved processes have been introduced into this country. Whilst this has effected some improvement in the quality of hot galvanising, it has not by any means eliminated the contamination of the zinc with the iron, as even in samples produced by the best processes there is found at least 2½ per cent of iron, and in many cases a considerably greater quantity. This contamination is inseparable from all known hot galvanising processes and seriously discounts the great value of pure zinc as a protective coating against corrosion.

*Reproduced in the United States by permission of the Ironmonger; Rylands Bros., Ltd., and Whitehead, Hill & Co., Ltd.

THE only alternative to hot galvanising is the Electro Galvanising Process, in which the protective coating is formed of zinc in its purest state. This process has for many years been spasmodically experimented with, but never really operated on a commercial scale until recent years. The design of this experimental plant was crude, the electrical side inefficient and unstable, and not sufficient thought was given to the proper preparation of the wire and strip previous to galvanising, a most important part of the operation. In consequence of this, the results were not altogether satisfactory, and the costs were high.

Fig. 2.

IN 1925, Whitehead, Hill & Co., Ltd., a subsidiary company of the Whitehead Iron and Steel Co., Ltd., was formed to take over the old-established business of J. C. Hill and Co., Ltd., at Cwmbran, Mon. At that time the plant was laid out for producing galvanised wire by both the hot process and electro deposition, the latter being simply an experimental equipment based on the Parker Patents, which were a marked improvement from an engineering point of view on any previous design. Steady progress has been made since then

in perfecting the process mechanically, electrically and chemically, and after a great deal of experimental work a satisfactory system has been evolved of annealing and preparing the wire and strip for galvanising in a manner which ensures uniformity of quality, and at the same time greatly reduces costs, as the whole process is a continuous one.

THE new process closely follows the mechanical operations of hot galvanising, and so in most cases can be substituted for it in the same buildings. The wire, after being drawn, is taken straight to the galvanising shop without any intervening preparation. It is placed on the usual type of swift, and is drawn through the galvanising process by means of the final winding drums, as in the hot process. The wire is first drawn through a lead annealing furnace constructed on an entirely new principle, which is capable of control within very narrow heat limits, and yet gives a wide range of annealing temperatures. It then passes through a very dilute bath of acid as a final cleanser, after which it is wound in several convolutions around two drums placed horizontally over each other at about 7 ft. centres. The lower drum is immersed with the anodes of zinc adjacent to the wire in the galvanising bath. Here lies the important difference between the new and the old process of electro-galvanising—in the old process it was usual to employ galvanising baths 60-80 ft. long, which were costly to construct and difficult to keep liquor-tight, and consequently much valuable zinc solution was frequently lost. The cathode connections were inefficient and not capable of dealing with one-fourth of the current density possible under the new process.

THE difference in the behaviour of zinc applied by the hot galvanishing process and by electro-galvanising is very clearly shown up in figs. 1 and 2, which are photomicrographs taken at a magnification of 560 diameters.

IT will be observed in fig. 1 that the coating is not uniform in composition, as on the outside (A) there is a thin layer of zinc slightly contaminated with iron in the form of small crystals of zinc-iron, and these crystals increase (B) as the base metal is approached until they form (C) a complete mass of zinc-iron alloy around it. On the other hand, it will be found in fig. 2 that this coating (A) is a uniform body of pure zinc. The small white areas in this photomicrograph are not impurities, but the reflection of light from the slightly roughened etched surface.

NOW we have to consider the respective values of these two forms of galvanising. Zinc in its pure state serves its purpose as one of the very best protective agents against atmospheric corrosion, but it loses a great deal of its value in this respect when alloyed with iron (if only to a slight extent) or contaminated with other impurities. Even the use of purest electrolytic zinc in hot galvanising will not eliminate this defect, whereas in electro-galvanising zinc of the most ordinary quality is refined in the process.

ANOTHER factor which arises from this contamination is that the zinc-iron, which is formed, is of a very brittle nature especially adjacent to the base metal, where the proportion of iron is the greatest. It is this brittleness which is the main cause, in most methods of hot galvanising, of the coating "peeling" from the base metal when bent. This is a particularly serious defect in the case of wire, which in nearly all its uses has to be severely bent or twisted.

The Advantages of Electro-galvanising

ON the other hand, electro-galvanising has none of these defects, as the zinc is deposited on the wire or strip in its purest form, and so retains the full value of this metal in its resistance to atmospheric corrosion. Zinc so deposited is in its most ductile form and so can stand up to the severest bending without any "peeling" or giving way. It forms a very close bond with the base metal, and what is important the coating is of a very dense and non-porous nature. The coating is truly concentric with the base metal, which is a feature not readily obtainable in the best practice of hot galvanising. This can be readily demonstrated by applying the Preece Test (copper-sulphate), when the failure is simultaneous all round the circumference of the wire, whereas in hot galvanised wire it breaks down on one or other side of the wire, or in streaks and patches. The smoother finish of electro-galvanised wire enables it more quickly to free itself from moisture.

IN hot galvanising a heavier coating has to be applied to give the same results, which is a serious disadvantage in the making of wire ropes and hawsers, where, firstly, the area of the weight-carrying material, i. e. the steel wire, has to be reduced materially in a given sectional area to accommodate the greater thickness of the galvanising coat, and so lessens the carrying capacity of such ropes. Secondly, the greater thickness of the coating not only causes more give under strain, but its brittle basis leads to its breaking up sooner under working conditions than the thinner and much more ductile pure zinc coating resulting from electro-galvanising. Another important factor in the electro-galvanising of high tensile wire is that it is possible to keep the effects of galvanising on the tensile and torsional tests within far more definite and closer limits than in hot galvanising, where the effect of the wire passing through the bath of molten zinc gives erratic results which are difficult to control. In electro-galvanising a sufficiently low temperature can be maintained as not to affect seriously the tensile strength of the wire; moreover, owing to its perfect control, definite and not erratic results are obtained, as in the case of hot galvanising.

Differences in Colour

A certain amount of prejudice has arisen in the past owing to the colour of electro-galvanised wire when manufactured, as it lacks the bright sheen of hot galvanised wire and is of a somewhat light matte grey. This, however, is

an entire fallacy as far as quality is concerned, as this bright sheen appears in hot galvanising, whether the coating is unwiped or wiped, or, in other words, whether the coating is a thick or a thin one.

IT is a curious fact that, whereas electro-galvanised wire is somewhat dull in colour when manufactured, it has a tendency to brighten after exposure to atmospheric conditions, whereas in hot galvanised wire the tendency is just the opposite, and such wire loses its colour and becomes quite dark in appearance. This change of colour in hot galvanised wire is due to the corrosive action of the atmosphere in attacking the iron in which is alloyed with the zinc in this form of coating. After two or three years' exposure to the atmosphere, in a fence in which hot and electro-galvanised wires have been mixed, the two descriptions can be clearly distinguished from a considerable distance, as the hot galvanised wire becomes almost black, whereas the electro-galvanised wire assumes a silvery appearance, showing that no chemical reaction has taken place to anything like the same degree as in the case of the hot galvanised wire.

Methods of Proving Zinc Efficiency

THERE are several methods of proving the efficiency of pure zinc as a protective coating against corrosion; firstly, by the electro-potential tests, by which it is found that in hot galvanising the difference of the potential between the coating the base metal rapidly falls as the coating is dissolved, due to the exposure of the larger areas of zinc-iron alloy. Similar tests on pure zinc deposited by electro-galvanising show that the potential difference is maintained until the coating is dissolved to the thinnest possible film, thus maintaining its full protective value up to the point of destruction. Secondly, under the salt spray test, electro-galvanised wire shows remarkably greater resistance than any form of hot galvanising. Thirdly, if comparative tests are made under the Preece Test between hot and electro-galvanising on straight wire, and these results are noted, and then the same wire is wrapped round either its own diameter, or twice its diameter, and again tested, it will be found that the resistance to the Preece Test is far less reduced in the case of electro-galvanising than it is in hot galvanising. Such reduction in the resistance to this test in the case of the electro-galvanising is almost entirely due to the mechanical thinning down of the coating due to its stretching during the process of wrapping. This again can be proved, as it is found that the failure has first taken place on the outer circumference, whereas in the inner circumference the resistance is actually slightly greater than in the original test on the straight wire, owing to the zinc compressing and thickening. The reason of the hot galvanising failing more rapidly is that the brittle undercoating of zinc-iron has developed minute fractures, through which the copper sulphate reaches the base metal.

Reliability of Tests

WITH regard to the Preece Test, whilst this is a convenient method of testing, it is not generally recognised as a reliable one, and is largely dependent on the opinion and experience of the observer. Even under the most skilled observation, widely different results are frequently obtained, and are the constant cause of disputes. After all, what is the Preece Test? It is simply a destructive agent to determine the thickness of a galvanised coating, without any proportional relevance to the purity of that coating, which is the essential factor in its resistance to corrosion. From the consumer's point of view it is not the thickness that matters; in fact, in many uses the thicker coatings are detrimental. What they want is a form of coating which offers the greatest resistance to corrosion, and this can only be obtained by depositing the zinc, in the process of galvanising, in its purest form. The fact that it looks pretty in its initial bright sheen is a very minor point compared with its duty of protecting the iron or steel wire or strip against corrosion.

UNDER these circumstances, in the absence of a better and equally convenient test to the Preece Test, it seems feasible to continue this method of testing, providing it is in conjunction with a co-efficient representing the degree of purity in the zinc. This should not be a very difficult problem for chemists to authoritatively determine. Under these co-efficients, pure zinc would represent 100 per cent resistance to corrosion, and zinc alloyed with iron or other elements would represent, for the sake of illustration, say, a co-efficient of 80 per cent, 60 per cent, or 40 per cent. It is only under methods of this description that the consumer would really know the true value of a coating necessary to protect the base metal.

IN conclusion, one cannot do better than quote the findings of that well-known authority, Prof. Burgess, of Wisconsin University, U. S. A. For testing the power of resistance of coating, Professor Burgess made use of dilute sulphuric acid, and found that an electrically deposited *coating one-third the weight* of that produced by the hot galvanising process had the same power of resistance to corrosion as the latter, and that for a coating of *equal thickness* the proportion of resisting power is as *ten to one.*

ELECTRO-GALVANISING is essentially a safe process for those operating it, as there are none of the noxious sometimes dangerous fumes which arise in hot galvanising, especially in some of the more recent processes.

▼ ▼ ▼ ▼ ▼ ▼

In the July issue of WIRE AND WIRE PRODUCTS Mr. G. K. Rylands of Rylands Brothers, Ltd., takes issue with Mr. Whitehead and presents some criticisms and information of real value to metallurgists and engineers engaged in the galvanizing of wire and strip.

Wire Manufacturing And Lead Patenting

By

C. B. Phillips

Vice President

Surface Combustion Co.

DIES are the critical points in the manufacture of wire, while the strength and endurance of the wire made, depend upon the best treatment given it. Dies of iron, steel, alloys and diamonds are used with varying results, and most wire makers are still experimenting with the newer alloys, with a view to attaining increased tonnages with decreased die costs.

The results obtained from much experimentation carried on at the plant of the Union Wire Rope Company, Kansas City, Mo., are interesting. This concern manufactures high carbon wire and wire rope for many industrial purposes, including logging, the oil industry, etc.

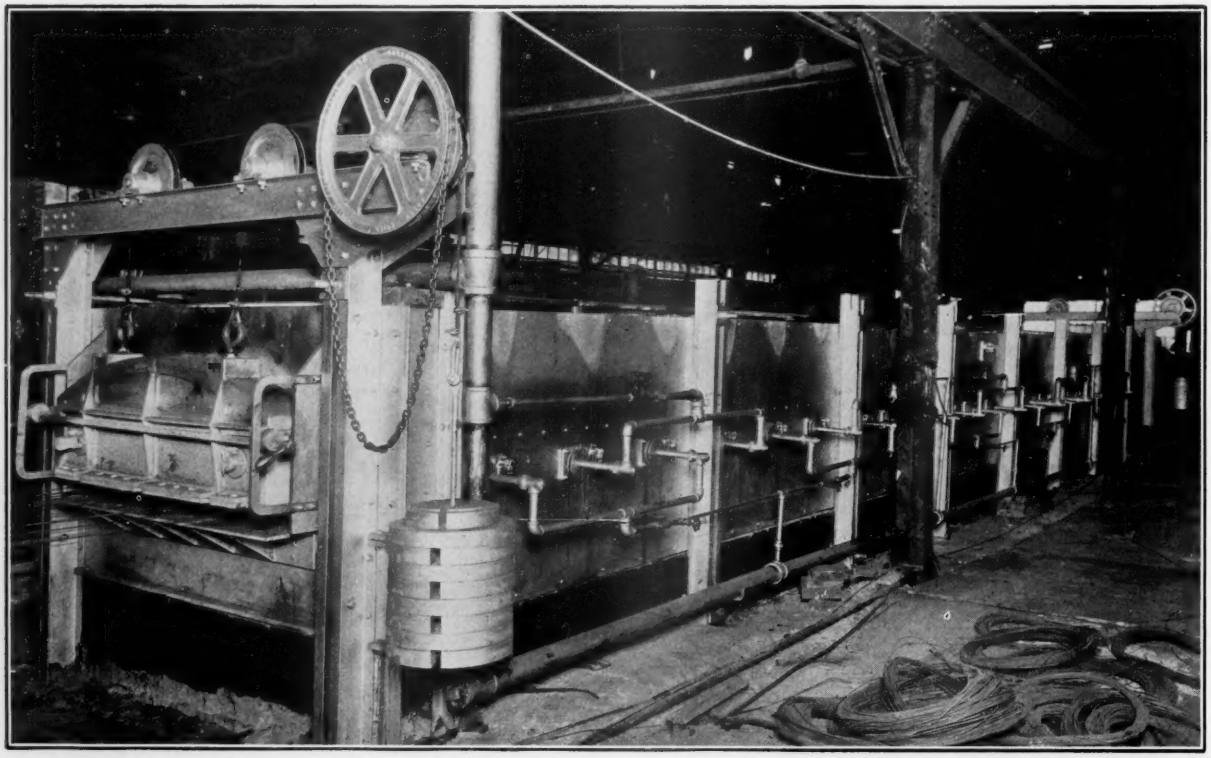
Results of Experiments at Plant of Union Wire Rope Company, Kansas City, Mo.

THE raw material used is in the form of steel rods and the diameters of the wires drawn, range from .014 to .148 in. Dies of chilled cast iron are commonly used here and the weights of these dies are as follows:—2½ lbs. for wires running up to .043 in., 5 lbs. for those ranging between .043 and .020 in., and 7½ lbs. for those above .080 in. in dia. These are made in the company's own tool and die division.

RECENTLY, dies of alloys in the tungsten carbide series, have been tried out at this plant, but so far, the increase in tonnage pulled, did not offset the greater die costs in any of the sizes experimented with. These alloys are practically the same as are being used for cutting and turning tools, with the addition of one or two other alloying metals. A far different result, however, has been obtained by makers of soft basic wire, where these alloy dies are being used quite successfully.

Plant Layout

THE main portion of the plant is housed in a long narrow building with long rows of benches arranged in lines with aisles between. These benches range in length from 50 to 80 feet, are 4 feet wide and 3 feet high. The



Continuous wire patenting furnace. Natural gas fired.

tops of these benches are of steel and the dies, set in blocks, are fastened in rows along the edges. Wires wound in coils on swifts, which set on the floor, are threaded through the dies, and are pulled through, and coiled up on motor driven blocks which set in a row along the center of the bench. One motor and one drive shaft serves to operate an entire bench of blocks. When a wire has been pulled, the block is transferred, as a swift, to the next smaller size die, and so on until the desired diameter has been reached.

AS previously stated, the raw material comes in the form of rods and these rods are coiled for ease in handling. The raw material and finished storage is in a separate building, 125x350 feet, through which a spur railroad track runs and over this is a traveling bridge crane of 15 tons. The rods are first pickled and the pickling layout is at one end of this building. It consists of a series of vats arranged in a circle with a swing post crane and hoist in the center. The vats contain dilute sulphuric acid, water, water under pressure, scull coating and lime coating and the coils are put through these in turn.

Lime Baking Ovens

THIS lime is baked on, in bake ovens, of which there are three. Each of these ovens is 42 feet long, 20 feet wide, and 6 feet high, is built of sheet steel and heavily insulated. On top of the oven is located a separate air heater, constructed of steel and insulated, and at one end is located three gas burners which fire directly into it. At the other end is a motor driven fan which sucks out the heated air and forces it into a pipe which carries it to four ducts, laid on the oven floor, which distribute the hot air uniformly throughout the oven.

Patenting Process

DURING the operation of drawing, strains are set up in the wire that must be removed by heating or patenting. For this purpose a patenting furnace, designed and built by the Surface Combustion Company, Toledo, Ohio, is used. This furnace is of brick construction, is encased in steel and is 60 feet long, 6 feet wide and 4½ feet high. It is designed so that either air patenting or lead patenting can be used, or both together. The lead bath is outside of the furnace, at the discharge end, and is held in a steel tank 8 x 4 ft. and 3 ft. deep.

THE furnace is heated with 40 gas burners, 20 on each side, firing just above the hearth. Gas is raised to 25 lbs. pressure in a compressor and inspirators, of the automatic proportioning type, are used with the burners. With this equipment, the gas and air can be proportioned with a single valve,

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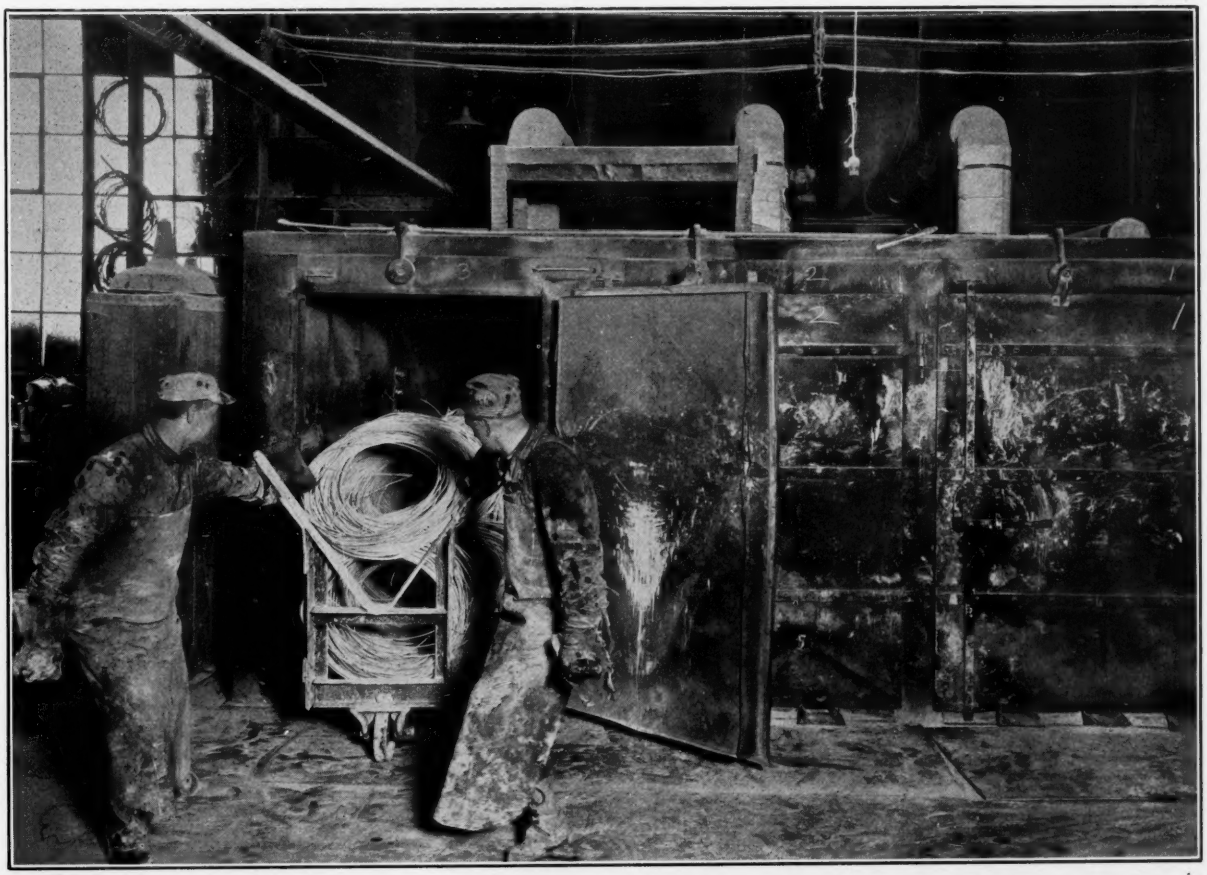


Unloading wire from baker.

Black Coloring of Wire Products

A Description of

German Low Cost Processes*

THE black coloring of wire products—nails, hair pins, safety pins, wire eyes, wire clips and the like is intended partly to cover the shiny metal and partly to increase the durability of the article. The processes coming into question must however be above all cheap and at the same allow the coloring of large quantities. This black coloring is effected partly in an oxydation process and partly also by coloring by mechanical means.

Nails

FOR nails and the like the most popular and practical process is burning with an oil or fat. This blackening of iron parts can be carried out in large quantities in a drum made of sheet iron about 2.5 mms thick. The drum has inside so-called stirers made of wire in order to prevent the articles to be blackened from caking together whilst the drum is rotated. One end of the drum is preferably made conical. A few small holes are provided in this end close to the driving axle, in order to enable the vapors formed during the blackening to escape. The drum has further an opening closed by a slide for filling, observation and emptying. The blackening is effected, as already mentioned, by burning-on oil or fat. This is used in this instance in the form of saw dust saturated in oil and the process is carried out in such a manner that the drum is first filled one quarter full of the articles to be blackened. The drum is then filled up to the second quarter with the oil saw dust mixture after which the drum is rotated over a source of heat. The oil-saw mixture is thus carbonised and the articles covered with a deep black coating. The progress of the coloring can be ascertained by repeated sampling. Too long heating results in grey black coloring. The use of linseed oil is most usual. This requires also the greatest degree of heat. The coating however adheres very well and does not wear off. Nut oil is the nearest to linseed oil as regards quality. Other oils, such as nigger oil, colza oil are certainly cheaper but are also less durable. Tallow on being burnt also gives a strongly adhering black varnish. For the mass articles mentioned a mixture of three parts of linseed oil, 1 part of colza oil and one part of ozocerite is also suitable. 1 kilo of saw dust is steeped with ⅛ to ¼ kilo of this oil mixture. Oil and saw dust are preferably intimately mixed before being introduced into the drum. The blackened articles are spread out on a sheet of iron to cool quickly and require no further treatment.

Pins and Needles

FOR blackening pins and needles a purely chemical coloring method is often used. As in this instance the articles are treated in cold condition, a detrimental influence on the hardness properties of the articles to be blackened need not be feared. The coloring is effected very quickly although the treatment must be carried out in two baths. The articles after having been carefully freed from grease and oxide are first dipped for ten seconds in a bronzing bath made in the following manner: 10 grs. sulphate of copper and 15 grs. stannous chloride are dissolved with 20 grs. of pure hydrochloric acid in 1 ltr. of distilled water.

First the sulphate or copper is dissolved in a portion of the water thereby heating, after which the remainder of the water and the other constituents added. After stirring the solution clouds over with a bluish white and finally precipitates white flakes. The articles are dipped in this bath freed from flakes and then washed in water, after which they are immediately dipped into a second bath for two to three minutes composed of a solution of 1.5 kgs. hyposulphate of soda (fixing salt) and 95 grs. of pure hydrochloric acid in 1 ltr. of water. This bath is prepared by dissolving the hyposulphate of soda under heat in the water and allowing the solution to stand until required for use. The hydrochloric acid is added shortly before use. When adding the hydrochloric acid the solution becomes milky through the precipitating sulphur; at the same time a strong suffocating smell of sulphurous acid becomes apparent. As the sulphur partly cakes into flakes and these flakes, if they settle on the articles, result in an irregular coloring, the bath is preferably passed through a wire sieve. The black color is produced by the formation of cuprous sulphide. The articles are then immediately washed with water and dried. The coloring is very durable and affords a rather good protection against rust. The bronze bath is of unlimited durability if stored in a well closing bottle. The coloring bath however quickly looses its coloring property but can however be repeatedly recuperated by fresh additions of hydrochloric acid and is then again ready for use.

Ironware

FOR black coloring of small ironware a number of special processes are also employed. Amongst

*Translation of description by Reinbach, Chemical Engineer, Draht Welt, Halle Salle, Germany, Feb. 1930.

these the diamond black oxide process is worthy of special mention. This is remarkable for its simple operation. The articles are in this instance only dipped for a short time in a hot coloring bath in order to obtain a deep black matt coloring. For the purpose of giving this coloring a polish the articles need only be placed a short time in sawdust moistened with oil and rotated in a drum. Soft soldered articles can however not be colored by this process as the soldering is damaged in the heated bath.

Mass Production

AMONGST other processes suitable for small mass articles, such as wire articles made of iron, the patented process of Dr. A. Mai should be mentioned, according to which the articles are dipped in boiling caustic soda to which an oxidizing medium is added. In order to maintain the caustic soda in statu nascendi burnt or slaked lime or a similar medium is added. In the patent specification bichromate, permanganate, nitrates, nitrites superoxides, chlorates, aromatic nitro combinations, such as nitrated cotton, nitrophenol, nitrotoluol, etc. are mentioned. As an example the following is given: 100 parts by volume of 33% caustic soda, 3 parts saltpetre, a small quantity of burnt lime. The lye is heated to boiling point, it boils at about 120 to 130° C., and the articles after dipping in hydrochloric acid or the like are dipped in this lye for about 15 to 30 minutes. It is possible to obtain bronze brown to deep black coloring with this process. With lyes of higher concentration which only boil at 180 to 200° C. a brown coloring is obtained already after 5 minutes. The colored articles are washed in water which can be used to replace the water lost by evaporation, and the last traces of lime may, if necessary, be removed with diluted acid.

TWO processes were protected by Sestini and Rondelli one of which consists in the dipping for half an hour in a boiling caustic soda lye of about 50% to which about 3% lead oxide, 2% cyancalium and 10% sodium nitrate (saltpetre) have been added, whereas the other consists in alternate anode and cathode treatment in a caustic soda solution in which sodium ferrite forms thereby. Also in this instance oxidizing medii are added although the bath acts satisfactorily without these. During the cathode treatment the articles are furnished so that rusty articles can be placed directly in the bath. The furbishing is carried out for about 2 minutes and the oxidizing for 3 minutes, increasing the voltage which is maintained at the higher voltage for 2 minutes longer, after which it is again reduced and the articles are washed.

A BLACK coloring of another kind is obtained if pulverised stick sulphur is dissolved in turpentine by heating on a water bath, and the articles are painted over with this mixture and heated as far as possible without coming into contact with the flame. This process is suitable for the coloring of a small number of articles made of cast or wrought iron if special experience in the carrying out of metal coloring is lacking.

FOR small iron articles smelting liquid coloring baths are often used consisting for example of a mixture of 4 parts of caustic soda and 1 part of saltpetre or more simply, melted and slightly overheated potassium or sodium nitrite, as also mixtures of nitrites and nitrates. Under this heading the Orthoman process patented by Prettner may be classed in which smelting is used composed of alkali-chromate and chromic acid or alkali salts of poly-chromatic acids. It is possible to produce a coloring from blue over brown to deep black. The coloring in such smelting baths is however open to one great disadvantage, namely the great loss of salt removed with the articles. As the temperatures of the baths vary between 300 and 500° C. these colorings can also not be used for hardened steel.

Lacquering

HOWEVER wire mass articles are often colored black by purely mechanical means, namely by lacquering process. In this manner hair pins, safety pins, etc. are mostly provided with a black coating. For dip lacquering both fat and volatile lacquers are used. Amongst these latter spirit as also sapon lacquers are used. The volatile lacquers have the advantage that they do not require a lacquering furnace they must however be thinned with a suitable thinning medium at the proper time, as the dissolving medium easily evaporates and the lacquers become thick very quickly. Fat lacquers are to be recommended where a particularly durable and perfect coating is required. When using fat lacquers either the lacquer or the article to be lacquered must be heated. In the case of volatile lacquers it is sufficient to dip in a room having a temperature of about 20° C. For lacquering hair pins for example mostly volatile lacquers of suitable consistency are used, such as are known on the market as hair pin lacquers. For the purpose of dip lacquering the hair pins are either suspended on frames with stretched wire in masses and then introduced into the dipping bath or they are pricked on boards or the like on which they are introduced to a certain mark in the dipping vessel. In the last instance the points remain bright. The frames with the needles are then dried in the air and afterwards introduced into a drying furnace where they are subsequently dried for about one half hour at a temperature of about 60° C. In order to prevent the pins from sticking to the wires, the frames are approached in the initial stage of the drying in horizontal postion onto a wooden plate or the like so that the pins are lifted on the wires. For dip lacquering however a certain amount of experience and practice is necessary. The bead or drop formation must be avoided by a certain amount of skill.

(*Please turn to page 250*)

Cleaning House Operation

By J. T. Lewis, Jr.,
Cleveland Electric Tramrail Division of
Cleveland Crane & Engineering Company

Installation of Straight Line Material Handling System Effects Great Savings for Manufacturer of Bolts and Nuts ▼ ▼ ▼

THE handling of materials through the various processes incidental to cleaning or pickling with either acid or caustic solutions has long been a problem to plant executives and equipment manufacturers alike. To the former it has been a problem of maintenance and to the latter a problem of design. When the designing engineer attacked the problem from the viewpoint of an operating superintendent, a completely new method was evolved. It was obvious that intermittent immersion in several solutions called for overhead handling, but at the same time it appeared that hoisting equipment which remained for any length of time over the cleaning tubs, suffered serious deterioration due to the inevitable fumes and vapors which are always present to a greater or less degree.

A few years ago the usual wire mill cleaning house was equipped with a battery of tubs arranged in either a single circle or concentric circles according to the capacity requirements. This group of tubs was serviced by either a single or multiple armed jib crane with a telescopic mast which was capable of rotation and which was raised or lowered by pneumatic or hydraulic pressure. In plan, the crane resembled one or more spokes of a wheel, and at the end of each spoke was suspended the load of material to be cleaned. By rotating and immersing the loads one tub at a time, the material would have been dipped into each of the required solutions and the process would have been complete at the conclusion of one revolution. It was found, however, that this layout of tubs was extravagant as far as space was concerned and extremely awkward in actual operation. The pneumatic hoisting, in particular, was so rapid that considerable loss of the solutions occurred through spilling and the workmen were in constant danger of being burned or scalded. Further, the atmosphere at the center of the circle of tubs was intolerable to the operators. A still greater objection to this method resulted from the unavoidable synchronization of movement of the several loads. Control of the processes was difficult with the multiple armed jib crane because it was necessary to have each load remain the same length of time in each tub unless a great deal of confusion and rehandling were to be encountered.

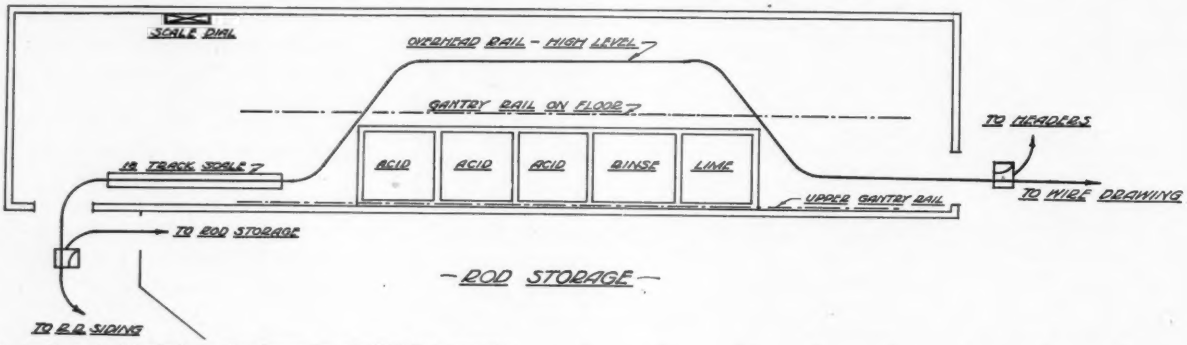


Fig. 1. Layout of typical cleaning house for straight line operation.

Straight Line Cleaning

TO facilitate the cleaning operations and to cut down the space requirements the straight line cleaning house was devised. By arranging the several tubs in a straight line so that the material was always in one directional travel made a marked improvement in the handling, and at the same time gave the operator a more complete and accurate control of the material while it was in any one of the solutions. Figure (1) shows the schematic layout of a typical cleaning house equipped with rectangular tubs for straight line operation. The actual sequence of the tubs would, of course, change with the particular

material under consideration. By varying the number of acid tubs and maintaining accurate control of the density and temperature of the solution, the time loss in moving the material may be reduced to a minimum. For example, steel rod must remain a certain time in the acid; so much must be allowed for the rinse and so much for the lime coating or sulling, as the case may be. Then if fourteen minutes are required for the acid, a few seconds for the rinse, and the lime coating is done in three dips at two minute intervals, the logical arrangement would provide room for at least two bundles of rod in the acid for every one in the lime. Each time a load is removed from the acid and carried through the process, a new load is placed in the acid tub in the space just vacated. If the material to be cleaned can be brought to one end of the cleaning house as quickly as it is required, and removed at the other end as quickly as it is finished, the cleaning operation can be made a one man job for upwards of twelve tons of rod per hour providing that the operator has suitable handling equipment at his disposal.

The tramrail method of hoisting and conveying the material from one tub to the next had its decided disadvantages because it meant that the electrical equipment was directly over the tubs and subject to objectionable fumes and vapors, and if the hoist were motor propelled with a cab control the operator had to be exposed to the same atmosphere.

To meet these objections a cleaning house crane having the hoisting and travel motors at floor level has been developed for this particular service. Fig. (2) shows a typical installation of this crane and the location of the runways with respect to the tubs. One runway is located on the floor and the other is mounted overhead and to one side, out of the path of the fumes. This method of construction leaves nothing but the structural members of the crane beam and one or two sheaves and cables directly over the tubs. No cross travel of the crane hooks is provided, of course, since the straight line arrangement of the tubs obviated the necessity for it. As is shown in the above photo the operator stands on a shielded platform fastened to the floor end truck so that he can step off at any time to adjust the load on the hooks, change the solutions, etc. It has been found that this type of crane resists corrosion to a marked degree, and that if the exposed parts are kept coated with a film of grease deterioration will be negligible.

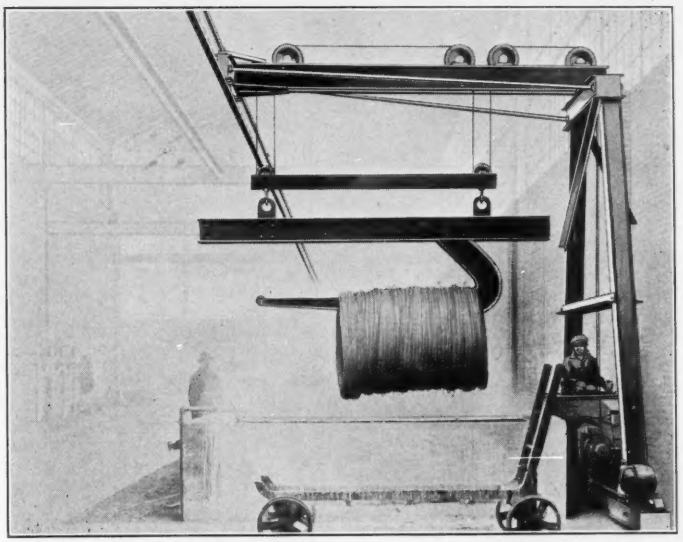


Fig. 2. Handling rod in and out of cleaning tank.
(Courtesy of Cleveland Crane & Engineering Co.)

The cleaning house crane has found extensive use among the largest copper and steel wire mills in the country and can also be used for cleaning metal parts prior to painting and plating. Small parts can be grouped into large loads

(*Please turn to page 247*)

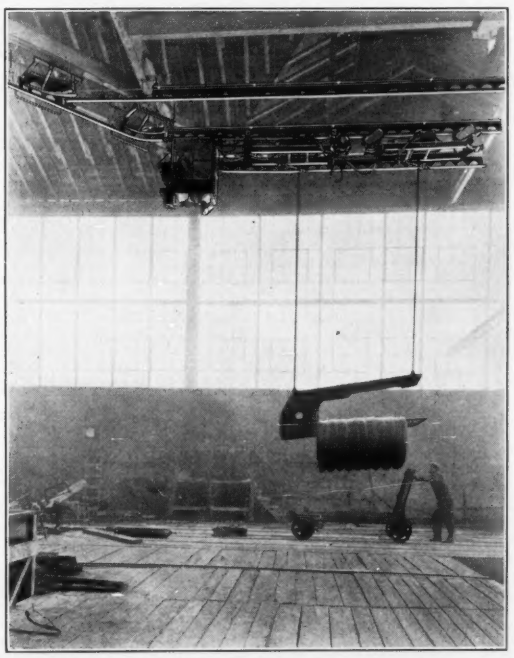


Fig. 3. Hair-pin hook places and removes coils from hand trucks.
(Courtesy of Cleveland Crane & Engineering Co.)

Sleeper & Hartley
TRADEMARK
REG. U.S. PAT. OFF. & PRINCIPAL FOREIGN COUNTRIES

AN INVITATION

MADE IN ELEVEN SIZES

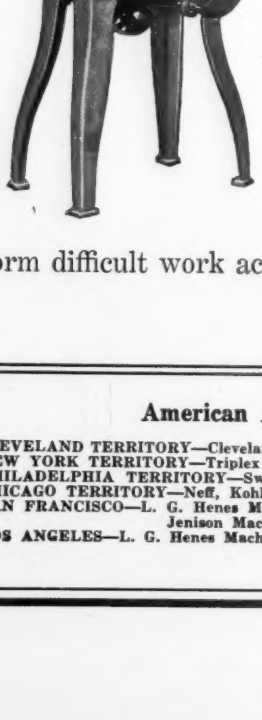
This Universal Spring Coiling Machine, which will be accorded a prominent place in our exhibit, is but one of a series of such coilers which handle oil-tempered wire from .004" to 5/8" in dia.

All styles of springs are coiled from cold wire, the ends of each being closed automatically as desired.

Changes may be made in spring forms by a twist of the wrist while the machine may be completely set up in from 10 to 20 minutes.

AN INTERESTING MACHINE

The Torsion Spring Winding Machine shown here will be on exhibit at Cleveland and is sure to attract much attention. This machine is made in 5 sizes, handling oil tempered wire from .015" to 3/8" in diameter.



A feature of the machine is that it will form ends on one or both ends of the spring putting crimps or loops into the wire as desired.

This machine has a wide range of adjustment. With special tooling it will perform difficult work accurately.

WE sincerely hope that all of our man Making industries will be able to a from June 15 to June 19. In addition drop into our booth and see the ma tion there.

These machines are but a trio taken from ou serve to give those unfamiliar with our li e a chines which we build. They will also serve will do in the way of production and in addi structed of the best materials in the best met of extremely long life.

Let our operators show you the working s of Engineer discuss production figures with you tion of some perplexing problem, allow us to p

Please bear in mind that the machines on exh tion of our line. Others, many of which may ticular business, are listed below.

SPRING COILING AND WIN
HOOKING, SETTING AND GR
WIRE COILING AND WIND
SPECIAL SPRING COILI
ELECTRICAL ELEMEN WI
ROLLER BEARING COILI
HIGH-PRODUCTION LOCKW
WIRE STRAIGHTENING AND C
FLEXIBLE CONDUIT, C
TUBE COILI MA
BX, CABLE, HOSE, ROPE, or IRE
WIRE NAIL AND STAPLE MA
COMPLETE WIRE MILL EQUIPME
and Continuous Wire Drawing Mach
and Takeups, Rolling and Formi g Mil
and Galvanizing Frames, Wire inter

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CLEVELAND TERRITORY—Cleveland Duplex Machinery Co.
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SLEEPER & HA

WORCESTER, MAS

ON FOR A VISIT

Sleeper & Hartley TRADE MARK

1 of our many friends in the Wire Mill and Spring
be able to attend the Wire show in Cleveland
9. In addition, we hope that one and all will
d see the machines which we will have in opera-

ken from our extensive line. However they will
th our line an insight into the diversity of ma-
ll also serve to give an idea of what our machines
and in addition will show why our machines, con-
the best methods, have built up their reputations

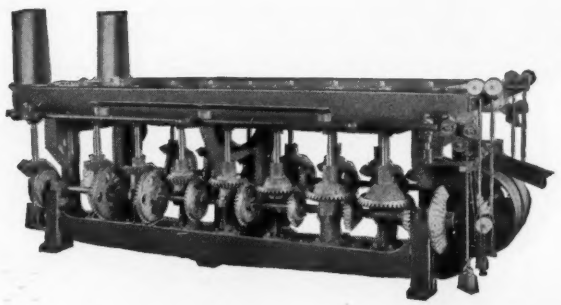
working of these machines. Let our Sales
ires with you and, if we can serve you in the solu-
allow us to provide that assistance.

chines on exhibit at Cleveland are but a por-
f which may be suited to production in your par-

G AND WINDING MACHINES
NG AND GRINDING MACHINES
AND WINDING MACHINERY
RING COILING MACHINES
LEMENT WINDING MACHINES
ARING COILING MACHINES
ON LOCKWASHER MACHINES
NING AND CUTTING MACHINES
CONDUIT, CASING AND
COILED MACHINES
PE, or WIRE ARMORING MACHINES
STAPLE MAKING MACHINES
LL EQUIPMENT including Single Hole
Drawing Machines, Patenting Furnaces
d Forming Mills for small wires, Tinning
, Wire Pointers, Reels and Wire Pullers.

ONE OF A COMPLETE LINE

With a professional wire-drawer in attendance the machine shown here will be in operation at the Cleveland Wire Show.



This wet draft machine, which draws from No. 22 to No. 36 high or low carbon wire, is one of the best production machines ever placed on the market. Each head will produce 110 pounds of No. 36 wire per 10-hour day and the average operator is able to handle six blocks easily.

With such production figures there is little wonder that we have been called on to manufacture several hundreds of these machines for wire mills throughout the country.

This machine, of the double bank type, is designed to draw fine wires under water but is also used successfully with a dry draft.

We also manufacture a complete line of wire mill equipment, including Wire Drawing machines in all sizes and in single hole and continuous draft styles.

HARTLEY, INC.

STER MASS., U. S. A.

Foreign Agents

UNITED KINGDOM— Fredk. A. Perry, 63 Queen Victoria St., London, E. C. 4
MONTREAL AND TORONTO—Arthur Jackson Machine Tool Co.
AUSTRALIA AND NEW ZEALAND—Edwin Wood Pty. Ltd., Melbourne
JAPAN—Andrews & George Co., Tokyo

The Wire Association

Vice President
HERBERT A. HORSFALL
President and Managing Director
Canada Wire & Cable Co., Ltd.,
Hamilton, Ont., Canada.

President
JOHN MORDICA
Supt., Rod and Wire Works,
Bethlehem Steel Company,
Sparrows Point, Md.

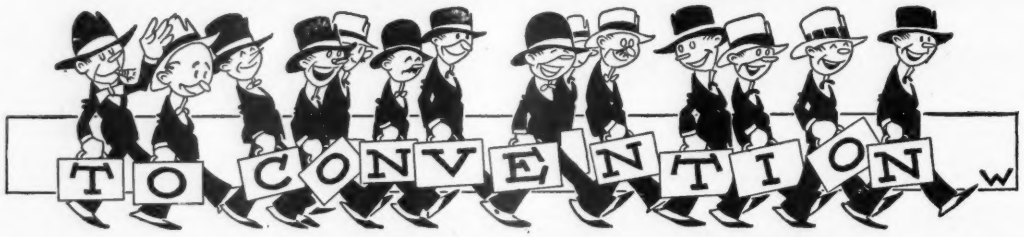
Vice President
L. D. GRANGER
Chief Metallurgist,
Wickwire Spencer Steel Co.,
New York, N. Y.

The Wire Association was formed at Buffalo in June 1930, at a meeting of wire mill production executives held in conjunction with an exposition of wire mill machinery arranged for by WIRE AND WIRE PRODUCTS.

Since its organization the Association has solved 175 technical questions. These questions have covered practically every operation used in wire production and manufacture.

In addition to the technical questions, 121 questions relating to the purchase of machinery and 40 questions relating to sources of supply for wire of various kinds were answered.

Are You Coming ?



AT CLEVELAND

June 15th to 19th, 1931

There will be a splendid exhibit of wire mill machinery and equipment and an excellent technical program.

A majority of the leading men of the industry have already indicated their intention of attending and participating in the discussions of the papers which will be presented. In addition to the program set forth, a splendid opportunity is offered to discuss informally, routine problems and to exchange opinions and ideas regarding equipment and processes used in the industry.

Every wire mill production executive engaged in the manufacture of wire and wire products of any kind is invited to attend this meeting.

At the convention there will be a business meeting of the Wire Association which will be limited strictly to the membership.

For the information of the members of the Wire Association it has been arranged to have Lieutenant Frank Bullock, Chairman of the War Department Commodity Committee on Wire and Cable of the Office of the Assistant Secretary of War, Washington, D. C., give an address outlining industrial planning for national defense with specific application to the wire industry.

Come to the Technical Sessions and Learn

Look Over This Interesting Program.

Technical Sessions---Wire Association---Will Be Held Tuesday, Wednesday and Thursday June 16th, 17th and 18th, 1931, at the Auditorium, Cleveland, O.

PROGRAM — TUESDAY, JUNE 16th, 1931, 9:30 A. M.

"History of Wire Industry" by Kenneth B. Lewis, of the Morgan Construction Company. A paper on the historical side of the wire industry showing the changes and developments in production methods.

"Methods of Heating Wire" by Joseph A. Doyle, Vice-President of the W. S. Rockwell Company.

"Galvanizing" by W. H. Spowers, Jr. Consulting Galvanizing Engineer.

"Rust Protection of Wire Products with Cadmium" by Clayton H. Hoff, Engineer, Grasselli Chemical Company.

"The Story of Steel"—A motion picture showing the manufacture of rods, rails, etc. together with inspection, cutting and finishing methods.

"Steel Wire Products"—A motion picture showing the manufacture of steel wire products, the preparation of rolling, drawing of wire, galvanizing of wire, making wire fence; winding wire and cold rolling of flat stock. Also shows the methods of heat treating, annealing, pickling, etc.

PROGRAM — WEDNESDAY, JUNE 17th, 1931, 9:30 A. M.

"Wire Mill Management" by E. G. Brown, Asst. Factory Manager, the U. S. Rubber Company, Bristol, R. I. A paper on the readjustment of manufacturing costs to meet changed business conditions.

"Wire Mill Cost Accounting" by L. D. Granger, Assistant to the Vice-President and Chief Metallurgist of the Wickwire-Spencer Steel Company, New York, N. Y.

"Lubrication" by R. T. Kline, Lubricating Engineer, the J. T. Robertson Company, Syracuse, N. Y.

"Lubrication and Application of Tungsten Carbide Dies" by C. R. Longwell, Engineer, the Carboloy Company, Newark, N. J.

U. S. Government motion picture entitled **"Submarine Cable Laying".** *This picture will show in detail the process of production of submarine cable and its actual use under working conditions. The production man will get an excellent idea of the necessity for a rigid adherence to specifications in manufacturing such cable.*

PROGRAM — THURSDAY, JUNE 18th, 1931, 9:30 A. M.

"Modern Rod Baking" by R. S. Coulter, Combustion Engineer, Lebanon, Pa.

"Manufacture of Insulated Wire & Cable" by J. W. Hackett of the Okonite Company, Passaic, N. J., accompanied by a motion picture film showing manufacturing processes of that firm and the machinery and methods used in the insulating of electric wire and cable.

"The Story of the Fabrication of Copper"—A motion picture prepared by the American Smelting & Refining Co., showing rolling of copper rods and drawing of wire: methods of annealing, pickling, washing and drying; method of coiling, cooling and gauging; making of trolley wire, winding wire; stranding and twisting into cables: and testing methods.

"The Manufacture of Wire Rope"—A motion picture of the technical processes of the John A. Roebling's Sons Company, Trenton, N. J., showing the steel mills, the blooming and rod mills, the wire mills, heat treating and cleaning methods and finally the huge machines fabricating the wire into many different kinds of rope.

Make your Reservation Now at the Hotel Cleveland and Write For Special Reduced Fare Railroad Certificate to

RICHARD E. BROWN, Secretary

THE WIRE ASSOCIATION, 551 5th AVE., NEW YORK, N. Y.

Constitution and By-Laws of The Wire Association

Dated as of Sept. 30, 1930

Revised as of Jan. 25, 1931

CONSTITUTION

We, the undersigned subscribers, being severally identified with the wire manufacturing and/or allied industries, mutually agree to form an association for the object, and under the plan, set forth below. By causing our names to be subscribed thereto we agree to the provision of this

CONSTITUTION.

ARTICLE 1

Name

The name of this Association shall be THE WIRE ASSOCIATION.

ARTICLE 2

Objects

The purpose of The Wire Association shall be:

To collect and exchange information relating to the production, distribution, consumption and use of wire and wire products;

To disseminate accurate information regarding wire products and how they best may be used;

To develop methods for the improvement of the welfare of those engaged in the wire industries, or in the use of its product; and for such other purposes as, from time to time, may be of benefit to the wire industries.

To improve production methods and to conduct research in all phases of wire drawing and wire working.

To develop and maintain friendly relations among the members and to afford them an opportunity for the interchange of ideas on production and management problems and to maintain a central clearing house for technical information.

To eliminate waste through simplifications and standardization of sizes, styles and varieties and to standardize trade terminology.

In general to promote the serviceability of the wire industries to the community at large.

ARTICLE 3

Limitations

No agreement, understanding, combination or arrangement or any form of concerted action to curtail production, fix prices, suppress competition, or in any other manner to restrain trade or commerce, or to monopolize, or attempt to monopolize any part of the trade or commerce of the country shall be permitted in The Wire Association, nor any other act or acts which may be in contravention of law or good business practice. Each member of the Association shall be wholly free to conduct his or its business without legal or moral accountability to the Association or to any member thereof.

ARTICLE 4

Inspection of Records

The books and records shall reflect the complete details of all the activities of The Wire Association, and shall be open to inspection at all times by the departments or bureaus of government interested. All reports of general interest distributed to the members shall be furnished to others desiring them for such consideration as may be regularly established by The Association.

ARTICLE 5

Non-Profit Organization

The affairs of The Wire Association shall not be conducted for profit.

ARTICLE 6

Membership

Any corporation, firm or individual actively engaged in the production, forming or fabricating of wire and wire products or the manufacture of wire mill machinery and equipment and any others rendering services to the wire industry shall be eligible for membership. Among individuals eligible for membership shall be wire mill executives, superintendents and foremen, plant engineers, traffic men, credit men, salesmen and all others engaged in the wire industry, manufacturers of wire machinery and equipment and persons interested commercially in the wire products industry. Acceptance of election to membership shall imply subscription to the provisions of this constitution. The By-Laws may establish classes of members with varying respective rights, privileges and powers.

ARTICLE 7

Management

The management and control of The Wire Association shall be vested in a board of directors, and in an executive committee of the Board of Directors empowered to act, ad interim, in accordance with the provisions of the By-Laws.

ARTICLE 8

Officers

The officers of The Wire Association shall be a President, one or more Vice Presidents, a Secretary, a Treasurer, a Chairman of the Board of Directors, all elected by the Board of Directors. The same person may be both Secretary and Treasurer. The duties and powers of the officers shall be defined in the By-Laws.

ARTICLE 9

Expenses

The expenses of The Wire Association shall be borne by contributions and by dues payable by the members in accordance with the provisions of the By-Laws.

ARTICLE 10

By-Laws and Amendments

The By-Laws of The Wire Association shall provide the rules and regulations governing the management and conduct of the organization not otherwise provided by the Constitution. This Constitution, and the By-Laws may be amended at any meeting of the Association by a two-third vote of the membership, either by vote in person or by written consent, provided two weeks' notice of the meeting shall have been given together with a copy of the proposed amendment. Until amended the By-Laws shall be the terms and tenor of the By-Laws attached hereto, bearing even date herewith.

IN WITNESS WHEREOF, we have caused our names to be subscribed hereto, by our respective proper officers thereunto duly authorized, as of the 30th day of September, 1930.

BY-LAWS

Dated as September 30, 1930. Revised Jan. 25, 1931.

ARTICLE 1

Membership

Section 1. Application for membership shall be in writing on forms provided by the Secretary, duly executed by the applicant and shall state:

(a) The name of the individual, firm or corporation applying;

(b) The branch of the wire or associated industries in which the individual, firm or corporation is engaged;

(c) The name of the applicant's representative, if a firm or corporation.

Applicants for membership in The Wire Association shall become members of this Association upon having received the written approval of not less than two members of the membership committee and upon payment of their annual dues except in the case of honorary members who shall be elected by unanimous vote of the full board of directors. (The applicant shall signify acceptance of election by subscribing his or its name to the Constitution and By-Laws.)

Section 2. Any member may withdraw at any time from membership in The Wire Association by giving formal notice of such withdrawal to the Secretary, and fulfilling all obligations to the Association incurred by that member to the time of withdrawal.

Section 3. Membership shall be divided into the following classes:

(a) Contributors:

Firms or corporations, who may, if they so elect,

designate a member of the Association with full voting rights, to represent them:

Annual contribution $100.00.

(b) Active Members:
Consisting of production executives, mill superintendents, metallurgists and foremen of mills which either draw, form or fabricate wire, with full rights to vote, right to serve on committees and to hold office.

Annual dues $10.

(c) Associate Members:
Consisting of all others actively engaged in the wire industry or in the employ of the manufacturers of wire mill machinery and equipment, or individuals rendering services of any nature to the wire industry for pay. Associate members shall have full rights to vote and serve as directors but may not hold office in the Association.

Annual dues $10.

(d) Honorary Members:
Shall be persons of acknowledged eminence in the wire industry, officers of the technical production services of the United States Army and Navy and other technical departments of the United States Government. They shall not be eligible to hold office or serve as Directors of the Association and shall have no vote.

Section 4. There shall be a membership committee of five members appointed by the President with the advice and consent of the Executive Committee. Vacancies on this committee shall be filled and new members added by the president with the advice and consent of the executive committee.

ARTICLE 2
Meetings of Members

Section 1. A regular meeting of the members shall be held annually on the third Wednesday in June of each year for the purpose of electing Directors and for such other business as shall be placed before the meeting. Special meetings may be called at any time by the President or the Chairman of the Board of Directors.

Notice of the time and place of all meetings shall be given to each member in writing or by telegraph at least ten days before the meeting.

Section 2. No Honorary member shall be entitled to vote at any meeting.

ARTICLE 3
Board of Directors

Section 1. The Board of Directors of the Association shall consist of the officers of the Association, to wit, the President, the Vice Presidents, the Secretary and the Treasurer and no more than ten other Directors elected at the annual meeting. Representation may be by proxy.

Section 2. The Board of Directors shall have power to hold meetings at such times and places as it deems proper. It shall be empowered to elect new members; to appoint an executive committee, and other standing committees, with such duties, consistent with the Constitution and By-Laws, as it may prescribe; to elect officers; and to have such other functions and authority as may be necessary to carry out the purposes of this Association.

Section 3. Regular meetings of the Board of Directors shall be held quarterly on the third Wednesday of March, June, September and December of each year. Special meetings may be held upon the call of the Chairman at any time upon the expiration of two days' notice.

Section 4. Five (5) members of the Board of Directors shall constitute a quorum.

ARTICLE 4
Executive Committee

Section 1. The executive committee shall consist of five Directors elected by the Board of Directors. The executive committee may act on behalf of the association in any matter upon which the Board of Directors is qualified to act, when the board is not in session. The executive committee shall appoint such clerks or other assistants required, and may provide in general for the detailed administration of the association. The Board of Directors in electing members of the executive committee shall designate one such member to serve as Chairman of the executive committee. The Secretary shall be an **ex-officio** member of the executive committee.

Section 2. Directors who are not members of the executive committee shall have the privilege of attending in person, or by proxy, all meetings of the executive committee, and to join in discussions, but without vote.

Section 3. Meetings of the executive committee shall be at the call of the Chairman upon at least one day's previous notice.

ARTICLE 5
Officers

Section 1. The duties of the officers shall be those usually pertaining to their respective positions.

It shall be the special duty of the Chairman of the Board of Directors to enforce Article 3 of the Constitution.

Section 2. The Secretary shall represent the executive committee as an administrative official, and keep a complete and detailed record of all meetings of the Board of Directors and executive committee. Subject to the control of the executive committee he shall be the active administrative executive of the Association.

Section 3. The Treasurer may be required to give bond in such a sum and with such sureties as the executive committee may require. He shall have custody of and shall receive and disburse all the funds of the Association.

Section 4. The officers shall be elected annually at the first regular meeting of the Board of Directors.

Section 5. Any vacancy caused by disability, resignation or otherwise, may be filled at any time by the executive committee.

Section 6. The officers shall be elected from among the mill production representatives only and must be either, executives, manufacturers, superintendents or foremen, with the exception of the secretary who need not be a member of the association.

Section 7. No person shall serve as President for more than two consecutive years and no more than one person representing the same firm or corporation shall serve as an officer of the Association during any one year.

Section 8. No officers shall receive compensation except the Secretary.

ARTICLE 6
Office and Publications

Section 1. The permanent office of the Association shall be located at the New York City office of "Wire & Wire Products," now published by the Quinn-Brown Publishing Corporation.

Section 2. Wire & Wire Products is designated as the official organ of the Association.

Section 3. There shall be published annually in Wire & Wire Products Annual Directory Index & Buyers' Guide the list of members, personnel of committee and general information concerning the Association.

Section 4. Each member of the Association shall receive, as included in his or its dues, a subscription to Wire & Wire Products and the annual "Wire" Directory. To this end, out of each member's annual dues paid in, the sum of five dollars shall be set aside for the purchase of such subscription.

Section 5. The Secretary, with the consent of the executive committee only, shall be authorized to cause to be printed and circulated among the members and such other classes of persons, firms or corporations as the executive committee may direct, any articles, compilations of statistics and other written information or material which may be of interest or value to the wire industry.

ARTICLE 7
Finance

Section 1. The annual dues shall be as follows:

Contributors
Companies, firms or corporations $100.00

Active Members
Wire mill production executives, mill superintendents and foremen $10.00

Associate Members
Individuals $10.00

Honorary Members
No annual dues.

Section 2. All dues shall be payable in advance and shall cover the period of one year from the last day of the month in which a member joins.

Section 3. Funds in excess of these provided by the annual dues which may be needed for research and other work, shall be secured by voluntary subscriptions to be solicited from the members, or from others specifically interested.

Wire Questions and Answers

Question No. 25--Rejections of Diamond Dies ▼ ▼ ▼ ▼ ▼

The Wire Association:

We would be glad to know some of the principal reasons for rejections of diamond dies.

Answer Number 1

The Wire Association:

The principal causes of rejection for diamond dies and diamonds may be divided into two general classes, (1) rejection of unset stones, (2) rejection of set stones.

Unset stones are usually rejected for three reasons:

A—Cracks.
B—Seams.
C—Carbon spots.

Set stones are rejected for four principal reasons:

D—Dies suck down.
E—Wire breaks.
F—Out of round.
G—Wire not straight.

D—Mounted dies are often sent back because they suck down. As a rule, the practice in most mills is to blame the dies. As a matter of actual practice a die will suck down for other reasons, such as: draft too large, too much soap solution, speed too high.

E—Very often, the wire breaks because there is not enough soap in the solution. The die is blamed while in fact, the trouble is due to the carelessness of the wire drawer.

F—If a die is not set straight in the die holder, the wire will not come out of round. The die is blamed while in fact, the trouble is due to the carelessness of the wire drawer.

G—Dies are sent back sometimes because the wire does not come out straight. As usual the blame is put on the die while the real trouble lies in the fact that the blank has not been properly adjusted in the die holder.

Answer Number 2

The Wire Association:

We would like to call the attention of wire drawers to something which we believe to be very important as we have seen lots of dies uselessly ruined through carelessness on the machines.

The wire should come in the die and out straight and furthermore, the dies should be allowed to move or revolve. These two rules must be followed otherwise the wire will become curly and flat on one side and the dies will wear out on one side if it cannot move. You would be surprised at the number of machines where the last die is working at an angle with the wire and where it is not allowed to move.

Answer Number 3

The Wire Association:

I have never recut a die, never strung up a wire machine, never drew any wire, therefore feel fully competent to criticize some of the methods now in use.

Now then, dies are kept in the machines altogether too long before they are taken out to be recut.

All die men know this but they cannot control it.

A die was sent to me this month that was marked .007 and .008 wire almost fell through it, .009 wire after having been pulled through it measured .008 and .0085; tried .010 wire but the die was so rough that the wire broke. This die was not smooth until it measured .00995 and .010.

The next die in the machine was .0063 and was intended to reduce the wire .0007 but in this case had to do many times that amount of work. The .007 die was so badly torn that to give the .0063 die the proper draft there should have been three dies between these two.

Yes I know the .0063 die was also worn and I will admit all the others were worn, but down at the end of the line there was a finishing die which has always had my sympathy, for the finishing die always gets Hell.

Of course the finishing die is replaced after it is worn all we think the customer will stand for, but often when they wear too much or too fast they are condemned while the die may be absolutely good while the other dies in the machine are so badly torn that the finishing die is entirely innocent though ruined.

This, like an emetic, brings up something else; when dies are allowed to get into the condition mentioned, labor and diamond dust have to be used, and paid for, to remove a large proportion of the diamond that should be used to draw wire.

This is expensive when compared with the little time required to replace worn dies in the machine often enough to save dies and obtain much better finished wire.

I am satisfied that if more attention was paid to the condition of all the dies in the machine, the die expense would be materially reduced and the quality of the finished wire much improved.

Diamonds are brittle as well as hard and abuse or neglect can shatter a die so that it will have to be recut up several sizes larger before the die becomes smooth again and often the strain on the die becomes so great that the die is broken and then, Good Night! for broken dies do not make good bortz.

"Up to now" we have been considering dies but how about the wire that is produced by dies in this condition? Suppose, as often happens in a case like this, that the .0063 die had been so badly punished that it has been replaced by a new die; then the wire, if it can be drawn through the new die, will measure what? And often the new die is blamed for the additional reduction in area.

Then the poor die man "gets his" because the die marked .007 and measuring any old thing has not been disturbed and although it is the one to blame it is not changed so long as wire can be pulled through it.

Wire that has been abused in breaking down will not make good fine wire because the ribs and fins that have been folded into it by the finishing die will sliver out and the wire will break when it becomes small or fine.

I am told that cold drawing, so called, strengthens wire, yet I have seen wire so hot during the cold drawing operation, that I wondered if the wire drawer was trying to combine the drawing and annealing operations to save time.

Of course this may not have been due to the condition of the dies. It may have been for the good old reason that they had always done it that way.

I note that "Trouble Shooter" thinks there is nothing occult in the wire game. Guess he never saw an oldtimer "casting" a die when he thought there was some one watching him. Nothing occult. Gosh. There is nothing else but!

When a boy I was taught that the modest unassuming shrinking violet kind of a boy always became the President of a railroad or a bank or something like that. To-day I think differently because my early education along those lines has cost me a million, more or less.

I believe that Emerson was all wet about that mouse trap and that sermon for to-day you have to advertise.

I am sending this in hoping like the French Canadian Captain who in a storm on Lake Erie ordered his vessel brought to anchor. His mate called back "My Captain, the anchor he have no rope. He cannot hold us," to which the captain answered, "Throw him over any how he may do some good."

The Wire Association is for the specific purpose of improving production methods. It was organized as a clearing house of ideas on technical problems and research work in all phases of practical wire drawing and wire working.

The following inquiries were received from and answered by members of the Wire Association. These inquiries are sent to the Secretary of the Association who acts as a central clearing point, and neither the names of the firms or individuals sending in the inquiry, or of the men or firms replying are divulged without permission.

Join the Wire Association!

Question No. 26--Electric Annealing Furnace Operation

The Wire Association:

We are attaching copy of a letter outlining the difficulties which one of our associates has experienced in connection with a car type annealing furnace installed about a year ago. This letter, we believe, is self-explanatory.

Wire Questions and Answers

Because we would like to know of the experience of some of the members of the Wire Association who handle a more diversified range of copper sizes than ourselves, we are bringing this matter to your attention.

"About a year ago we purchased a car type Electrical Annealing Furnace. However, in spite of a very considerable amount of development work this furnace continues to give unsatisfactory results.

An illustration of what our Associates consider satisfactory operation would be, the holding of 6,000 pounds of wire between 800° F. and 825° F. for 50 minutes, after which the wire should be bright and fully annealed. In all cases where we approach this condition the wire is annealed correctly but tarnished and discolored. On the other hand, if the temperature is lowered and the period increased to 100-120 minutes, satisfactory results are obtained but, of course, at the expense of reduced output. The factors affecting the brightness of wire are:

(1) Condition of wire before annealing
(2) Exclusion of air from the retort
(3) Exclusion of products of combustion from the retort
(4) Rate of charging
(5) Rate of discharging

Regarding (1), we can say that all our wire would pass proper visual inspection although it must hold traces of drawing compound which are not visible to the eye. The compound used is a 50-50 mixture of soap and rape seed oil by weight dissolved in six times its volume of water.

For (2), proper attention has been given to the retort to insure its being air tight. However, it has been suggested that since our boiler feed water is air pumped from an artesian well, it is possible that the steam used for the furnace is contaminated with air and this is being checked.

As to (3), the furnace is heated electrically and this point should not arise. It has been suggested that possibly the floor brick lining of the retort gives forth harmful gases, but this seems doubtful because the furnace has been sufficiently long in service for this trouble to right itself if it existed.

Regarding (4) and (5), it is certain that both charging and discharging are being done slow enough and with such proper care that our trouble is not due to suction at the relief valve in the retort or to breaking the water seal.

The foregoing outlines our condition and we have given it somewhat at length in order that your engineers might secure a better idea of our difficulties as we would like to know if your plants had similar experience when they changed from oil fired to electric furnaces, together with the manner in which they traced the causes of the trouble and what steps were taken to obtain satisfactory results.

As bearing upon this same subject, we are aware that there is a company which makes a compound for annealing furnaces, a small amount of which added to the water tank thoroughly stirred is claimed to make the wire come out bright and uniform in color and with the right proportions of compound, the claim is that the wire should come out dry, that is, not oily or greasy, and should take tin or enamel, as the case may be, very easily. We are wondering if you have had any experience with this compound.

Answer Number 1

The Wire Association:

"We suggest that your correspondent try using some number C-450A Ironsides Cleaning Compound in the water sealing the furnace.

We have found that the use of this compound in the water sealing of our furnaces of both the Kenworthy and Bates and Peard types has produced a brighter wire than was otherwise obtainable. In regard to the last paragraph of your correspondent's letter, we have never heard of using sheet metal for absorbing any oxidizing gasses, but in some of our annealing operations we have used small amounts of fine wire scrap for this purpose."

Answer Number 2

The Wire Association:

We cannot understand why the Electric Annealing Furnace used by your inquirer is not giving satisfactory annealing. We have a total of approximately eight of these furnaces installed in the various plants of our company. These furnaces are run from 700 to 1100° F. and we secure very good results, both from the standpoint of anneal and finish. The total time in the furnace for each charge varies from about 1 hr. 20 min. to 2 hrs. depending upon the size of the charge and the size of the wire being annealed.

In the operation of these furnaces, it is essential that a slight pressure of steam be kept in the furnaces at all times. This steam of course should be free from air and should preferably be dry steam.

The only difficulty which we have encountered in the operation of these furnaces in regard to the surface condition of the wire has been when insufficient amount of steam was used to provide a slight pressure and when the water seal at the bottom of the furnace was broken during the time the charge was being lowered. The water level in the pit beneath the furnace should be kept at the proper level at all times, otherwise there is danger of breaking the seal at the time the hot charge is lowered into the water.

In the operation of these furnaces which we have in our own plant, we have experienced occasionally a slight discoloration of the copper wire on the first charge annealed after a shut-down period. This was due to furnace chamber not being entirely purged of air by the steam before the first charge was placed in the furnace.

Question No. 27--Bright Finish for Low Carbon Steel Wire

The Wire Association:

The problem has arisen regarding low carbon steel wire, and it might be possible that you have in your files detail of the lubricants used to get bright finish, such as is now required on spoke wire.

Answer Number 1

The Wire Association:

This finish seems to depend on a combination of dies and lubricants. It is suggested that you first use a light lime and then in drawing the wire use Aluminum Stearate in the die box in connection with tungsten carbide dies. My experience has been that the tungsten carbide die produces the brightest finish, composition dies the next brightest finish and diamond dies the least bright finish.

(*Please turn to page 252*)

Outstanding Personalities of the Wire Industry

HERBERT HORSFALL

HERBERT HORSFALL, Vice President of the Wire Association is President and Managing Director, Canada Wire & Cable Co., Ltd., President of the Lake St. John Power & Paper Co., Ltd., Vice President, Leaside Engineering Co., Ltd., Director, General Steel Wares, Ltd. Born in Sheffield, England, January 27, 1880, Mr. Horsfall was educated at Public Schools in Montreal, Quebec and later at McGill University, Montreal, Quebec.

Mr. Horsfall started business with Dominion Wire Manufacturing Co., and became General Superintendent, Dominion Wire Manufacturing Co., Lachine, Quebec, 1905 to 1910; Works Manager, Canada Wire & Cable Co., Ltd., Toronto, 1911 to 1915; Works Manager, Leaside Munitions Co., Ltd., 1915 to 1918; Vice President and General Manager, Canada Wire & Cable Co., Ltd., 1918 to 1928; now President and Managing Director.

He served as Town Councillor of Leaside from 1918 to 1922 and as Mayor of Leaside, from 1923 to 1929. He is a member of the Engineering Institute of Canada, and of the National Club, Mississauga Golf & Country Club, Granite Club and Engineers' Club.

W. H. SPOWERS, JR.

W. H. SPOWERS, JR., Consulting Engineer on galvanizing New York City, has announced the enlargement of his services through associating with him **Mr. A. T. Baldwin,** Chemical Engineer. Mr. Baldwin is a graduate of the University of Pennsylvania and has at his command extensive chemical and metalurgical research experience.

Mr. Baldwin was head of the Chemical Laboratory division of the National Carbon Company's Research Laboratories for a number of years and was responsible for the successful production of the Red Seal Dry Battery for the Manhattan Electric Supply Company. He has resigned his association with the General Electric Company to undertake research work in Mr. Spowers' laboratory and this association will mean that for the first time the hot galvanizing industry will have the benefit of independent and experienced research work.

A. T. BALDWIN

G. H. Garcelon has been appointed Manager of the Control Engineering Department of the Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.

Mr. Garcelon succeeds **J. H. Belknap,** who has been transferred to the Engineering Division of the Pittsburgh district office of the Company. The new manager of the Control Engineering Department entered the employ of the Westinghouse Company upon his graduation from Massachusetts Institute of Technology in 1903, and before his recent appointment was Manager of Engineering for the Company's Works at East Springfield, Massachusetts. He is well known for his work in designing small motors.

J. S. Bigham, formerly of the Pennsylvania Smelting Company, Pittsburgh, and **J. A. Brockman,** formerly of the American Lead Company of Indianapolis, have become associated with Goldsmith Brothers Smelting & Refining Company, Chicago.

Mr. Bigham has been with the Pennsylvania Smelting Company sixteen years and recently with the American Metal Company.

No Rejects

Personalities and Gossip of the Wire Industry as Told by a Roving "Trouble Shooter" ▼ ▼ ▼ ▼

IF it all weren't so serious it would be truly laughable. The chorus of those who raise their voices to chant of American efficiency numbers many who do their best to thwart development within their own plants and consequently impede the forward movement of the industry. How many times have I heard superintendents who render strenuous lip service to the slogan of Progress, bar the way to the most primary of innovations, for reasons best known to ordinary men, ego, politics, fear of their jobs, whatever motive can make otherwise progressive men think they can retard the inevitable.

WIRE, like all the "two plus two" industries has reached its present stage of development through long years of heart-breaking experience. In most of its phases it seems to have passed the patentable stage, in so far as the processes of manufacture are concerned. Since this appears to be the fact, except where patented machine development can come into economic play, profits are to be scalped from superior organization. Given an equal start, with identical equipment, (good or bad) some superintendents will coax more profit out of a job than others. This need not necessarily be at the expense of the workman, and for the more progressive executive it is not.

YOU needn't tell me how hard it is to be progressive, when you are up to your neck in petty squabbles such as, the appointment of a new assistant superintendent who is a dumb-bell, a shortsighted vice president who tells you that you must cut here or—well you know the story. I know because I believe I have seen every phase of the discouraging business of running a wire mill, but the fight to keep things on an even keel, the encouragement of your staff for new and progressive ideas, spells steady personal development and satisfaction.

OH yes, I know, our prices were too high; couldn't get the business. Why were they too high? The sales force weren't on the job? Management again. Our customers aren't doing as much this year. I know, but ask the ones who were busy this year where they got the business.

MOST of us need a good kick in the pants. All of us have the native equipment in brains to do a job much better than we are now doing it, but we have become weary with well doing. Most of us with a little courage and our own brain equipment can pull ourselves out of the lethargic mire we are in and make profits grow where only red losses show up.

YOU know this isn't my job. I am supposed to tell the rest of you each month, what good fellows I run across during my travels. On the whole the men I meet in the wire industry are finer and of a higher type than in any industry which I contact, but and the "but" looms large—BUT—It gets under my skin to see so little progressive activity coming from within an industry the personnel of which has so much latent genius.

THE measure of success of any industry, corporation or government is generally in direct ratio to the management. Look over the wire firms who have been busy this year, only a dozen or so among the three hundred and more in this country and you will have the unsung leaders of your industry. Alibi all you want about the other fellow but the fact remains.

SNAP out of it! Forget petty politics! Remember that mills don't operate on social prestige and friendship or love of antiques. Get some new ideas and don't buy them all. Originate them! You have them on tap in that old bean of yours. Give your courage and your noodle a break—the Lord knows you have tried every other means.

THERE is no Pulitzer Prize for the wire industry, but in my humble judgment the years' Roll of Honor should read something like this—

King and J. Breining of Pittsburgh Steel, Monesson, Pa.

Philips & Ward of Bethlehem Steel Company, Johnstown, Pa.

Eberle of Jones & Laughlin Steel Co., Aliquippa, Wks.

Herman of Keystone Steel & Wire Co., Peoria, Ill.

Spillman of Pittsburgh Tube Co., Monaca, Pa.

Mordica of Bethlehem Steel Company, Sparrows Pt., Md.

Walter Smith of Chase Brass & Copper, Cleveland, O.

Patterson of American Steel & Wire, Rankin, Pa.

Fast of Belden Mfg. Co., Chicago, Ill.

Hill of Northwestern Barb Wire, Sterling, Ill.

Worthington of American Steel & Wire, Trenton, N. J.

Kinn of Seneca at Fostoria, Ohio.

Wright of American Fork & Hoe, Geneva, Ohio.

Walter Stone of Republic Steel Corporation at Chicago.

Todt of Michigan Brass & Copper, Detroit.

Judd of American Brass Co., Waterbury, Conn.

Seymour & Preston of Page Steel & Wire Co., Monesson, Va.

Hitchcock of Atlantic Wire Co., Branford, Conn.

Miller, Henly, Anderson and Rahr, the Four Horsemen of Extrusion, of Chicago Extruded Metals.

Nullmeyer of Youngstown Sheet & Tube Co.

'Round the World With the Wire Industry

Manufacture of Metal Cloth in France

THE increasing popularity of metallic cloth for bolting, in which it is claimed to be superseding silk on account of durability and lower cost, and its larger use for manufacture of high grade papers are indicated by the extension of manufacture in eastern France. Several kinds of metal wire are used in the industry, the larger part being of copper or phosphor-bronze. The copper is largely of American origin, drawn into wire in France and purchased in large sizes by the factories, which reduce it to the required gauge. One important firm buys only ingots and performs the entire process of wire-making.

A large part of the production of the various factories is for home consumption, although there is a heavy export trade, especially in the finer grades. Bolting cloth is sold to Argentina, Mexico, Italy, Spain, Germany and the United States, with smaller shipments to other countries. Wire cloth for paper mills goes principally to Germany, Great Britain, the Netherlands, Norway, Sweden, Belgium, and Italy. Most of the important companies have agencies in all parts of the world.

Sales of metal cloth to the United States reached 135,808 pounds in 1928, but declined to 106,216 pounds in 1929 and 85,123 in 1930.

✦ ✦ ✦

Soviet Will Receive British Technical Aid

A TECHNICAL agreement of far reaching importance and extending over a number of years has been signed between the Soviet Government and the Metropolitan-Vickers Electrical Company, Ltd.

This large British manufacturing concern has agreed to provide expert technical assistance in the manufacturing of certain electrical plants which will be required for the generation and distribution of electricity in connection with the five-year plan.

The machinery, to be manufactured in the works of the All-Union Electro-Technical Combine in Russia, includes steam turbo-generating equipment, condensing equipment, heavy electrical equipment, industrial motors and switch gear.

✦ ✦ ✦

New Wire Rope Works for Cardiff, Wales

A LARGE new wire rope works equipped with the most up-to-date machinery is to be established at Cardiff immediately by D. Morgan Rees, of Whitchurch, who was head of the Excelsior Wire Rope Co., one of the associated concerns in the British Ropes combine. A site of five acres has been secured and it is expected that the new works will be ready to begin operations in September.

The contract for large works extensions of George Elliot & Co., wire rope manufacturers of Cardiff, has been secured by Rees & Kirby, Swansea, in keen competition, tenders having been received from all parts of the United Kingdom. The enterprise, which was founded by the late Sir George Elliot over 60 years ago, was in December last taken over by new owners, who are extending and re-equipping the works.

✦ ✦ ✦

American Tariff Restricts English Wire Exports

ENGLISH manufacturers feel that the very heavy duties now imposed by the United States on imports of fourdrinier wires and cylinder wires will make it impossible for them to do business in the United States. They also feel that it is a matter of regret that manufacturers in England are not protected by their government in the same manner as United States manufacturers are as the English markets are open to unrestricted competition which makes it very difficult for the British weavers.

Industrial Diamond Marketing Rearrangements

IN order to stabilize the industrial diamond industry a reorganization has taken place in the marketing arrangements as follows:

The Diamond Corporation, Ltd., was recently formed to join the interests of the diamond syndicate and the diamond producers and has sold stocks of diamonds to a new company called International Diamonds, Ltd., together with all sales rights covering the future handling of these qualities of diamonds.

This new company has in turn made arrangements with L. M. VanMoppes & Sons, of Gardiner House, London, E. C. I., England, in order that the sale of all industrial diamonds controlled by the Diamond Corporation and other producers will be in their hands. These arrangements will not in any way affect prices of industrial diamonds but are designed primarily to give better service to purchasers of such diamonds.

✦ ✦ ✦

Platinum Refinery Opens In England

DURING the past month the world's largest refinery of precious metals began operation at Acton in West London.

Using Canadian ores almost exclusively, the new refinery will be able to satisfy three-quarters of the world's demand for platinum and its associated metals, which include such rare products as palladium, iridium, rhodium and ruthenium. Hitherto Russia and South America have been the principal sources of these metals, but the discovery of huge new supplies in the nickel and copper region of Ontario made the extension of the Acton plant necessary.

The Acton refinery, which is operated by the Mond Nickel Company, will be able now to produce 300,000 ounces of precious metals each year.

A Review of Recent Wire Patents

No. 1,799,343, REEL, Patented April 7, 1931, by George N. Williams, of Kokomo, Indiana, Assignor to Continental Steel Corporation, of Kokomo, Indiana, a Corporation of Indiana. This invention has reference to reels upon which wire or like material is reeled or coiled in bundles, and the reel itself is constructed of heavy wire, bent to form end members and tie rods.

No. 1,799,698, MACHINE FOR APPLYING REENFORCED WIRE TO CLOTHESPINS, Patented April 7, 1931, by John R. Nolan, of New York, N. Y. The invention comprises a suitable supporting element for the wooden clothes pins, means for feeding and positioning the pins, means for positioning a predetermined length of wire in close relation to the path of each pin borne by the support, means for bending the wire about the pins and twisting it together, and means for clinching the wire ends in the space between the legs of the pin.

Reissue No. 18,030, METHOD OF APPLYING PROTECTIVE LAYERS ON METALS OR OTHER ELECTRIC CONDUCTORS, Reissued April 7, 1931, to Jonas Hjalmer Mellquist, of Stockholm, Sweden. This is an electrogalvanic method of applying a layer of high oxidation potential on electric conductors, especially metals, and consists in using the conductors as an anode in an alkaline solution of a hydroxy carboxylic acid salt of a metal adapted to form peroxides. The preferred salts used are lead or manganese salts or hydroxy carboxylic acids, especially of tartaric acid.

No. 1,800,914, APPARATUS FOR STRIPPING COVERED STRANDS, Patented April 14, 1931, by John Stanley Stull, of Chicago, Illinois, Assignor to Western Electric Company, Incorporated, of New York, N. Y., a corporation of New York. An object of the invention is to provide a machine for stripping the coverings of continuously covered strands for predetermined lengths, and at predetermined points throughout their length. A revolving drum, carrying a number of clamping and severing devices, clamps a pair of twisted conductors, severs the insulation at a predetermined position, and a stationary cam member causes a movement of the operative cutting device in a directional reverse to that in which the drum is moving while the clamped conductors are advanced, thus moving the insulation back along the conductor cores for the predetermined distance, exposing the cores.

No. 1,800,411, COATED CORE, Patented April 14, 1931, by John Nilsen Selvig, of Chicago, Illinois, Assignor to Western Electric Company, Incorporated, of New York, N. Y., a Corporation of New York. It is the primary object

Complete Descriptions and Drawings of Patents May Be Had for 25 cents. Address, Wire & Wire Products, 551 Fifth Avenue, New York.

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of the invention to provide a core having a continuous integral coating of felted fibrous material unattached to the core.

No. 1,800,872, FOURDRINIER WIRE FABRIC, Patented April 14, 1931, by Guy M. Peterson, of Springfield, Massachusetts, Assignor to Cheney Bigelow Wire Works, of Springfield, Massachusetts, a Corporation of Massachusetts. In order to increase the life of the wire mesh, the inventor makes up some of the warp wires of coppery metal, and the other warp wires of stainless steel, the weft wires being of the coppery metal.

No. 1,801,813, METHOD OF WATERPROOFING SHEATHING FOR ELECTRICAL CONDUCTORS AND THE PRODUCT THEREOF, Patented April 21, 1931, by Joseph A. Kennedy, of Pawtucket, Rhode Island, Assignor, by Mesne Assignments, to Anaconda Wire and Cable Company, a Corporation of Delaware. The sheathing consists of interconnected strands which have been previously impregnated with a solution of normally solid hydrocarbon in a volatile solvent, and dried, prior to their interconnection, the sheathing having an outer coating of hydrocarbon which has an affinity for the impregnating hydrocarbon.

No. 1,802,030, INSULATING LAYERS OF DIFFERENT DI-ELECTRIC COEFFICIENT, Patented April 21, 1931, by Hans Meurer, of Cologne, Germany, Assignor to Felten & Guilleaume Carlswerk Actien-Gesellschaft, of Cologne-Mulheim, Germany. This electric cable construction includes a graded insulation on the wires consisting of a number of layers of similar paper, the paper forming the layers being compressed to various densities to produce correspondingly different dielectric constants, the dielectric constants and the densities of the layers disposed nearest the conductors being highest and gradually decreasing outwardly from the conductor.

No. 1,802,453, WIRE SKINNING MACHINE, Patented April 28, 1931, by Harry R. Wright, of Chicago, Illinois, Assignor to Reserve Holding Company, of Kansas City, Missouri, a Corporation of Delaware. Designed for the purpose of removing insulation from wires for use in connecting together terminals of switch banks, this machine skins the wire in the necessary equal intervals.

No. 1,802,605, METHOD AND MACHINE FOR INSULATING CABLES, Patented April 28, 1931, by Archie R. Kemp, of Westwood, New Jersey, Assignor to Bell Telephone Laboratories, Incorporated, of New York, N. Y., a Corporation of New York. An object of the invention is to provide a method and means for developing the necessary pressure in the viscous material as it enters the extrusion chamber in the insulating of submarine cables.

No. 1,802,657, EXPANSIBLE AND CONTRACTILE GRIPPING DEVICE, Patented April 28, 1931, by Vivien Kellems, of New York, N. Y. This gripping device comprises a multiplicity of wire strands interlaced or interwoven about a common axis and extending continuously from the draft end of the cable receiving end and return to the draft end to form a series of return bends at the cable receiving end arranged in substantially uniform spaced relation circumferentially so as to enable that end to be more easily placed over and upon and removed from the article to be gripped.

No. 1,802,799, WIRE TWISTING MACHINE, Patented April 28, 1931, by Leroy A. Weston and Lawrence O. Weston, of Adams, Massachusetts. For twisting the ends of binding wire onto articles of any description, the inventors provide a machine having a rack and pinion arrangement for turning the wire upon itself and bending the end against the wire.

No. 1,802,822, WIRE STITCHING OR STAPLING MACHINE, Patented April 28, 1931, by Arthur H. Maynard, of Warwick, Rhode Island, Assignor to Boston Wire Stitcher Company of Portland, Maine, a Corporation of Maine. This invention relates to box stitching machines for stitching the flaps in bottoming cardboard cartons and boxes. The invention is directed to the work-support for holding the boxes during the operation of stitching their flaps together.

No. 1,803,144, TIE ROD FOR WIRE FABRIC BELTS, Patented April 28, 1931, by Edward F. Pink, of Cambridge, Maryland, Assignor to The Cambridge Wire Cloth Company, of Cambridge, Maryland. The tie rods are adapted for use in connection with the patentees' wire fabric, patented April 2, 1929 (U. S. Letters Patent No. 1,707,567).

▼ ▼ ▼ ▼ ▼ ▼

A series of articles giving details of automatic control systems for wire furnaces showing the design and construction of the regulators and also giving detailed information on complete equipments and working results secured in the principal wire mills in Germany, written by F. Aschner and H. Mayer-Witten, Engineers of the Combustion Engineering Department of the Allgemeine Elektricitats-Gesellschaft, Berlin, will commence in the July issue of WIRE AND WIRE PRODUCTS.

New Wire Machinery

Description of Recently Developed New Tools of Interest to the Wire Industry

KANE and Roach Inc. of Syracuse, N. Y., recently completed the design and experimental work of a cold roll forming machine necessary to economically manufacture a patented retainer strip for gypsum

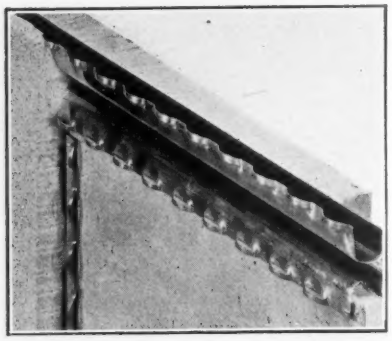


Fig. 1. Retainer Strip Acts as Anchor.

board, when it is used in place of wood or metal lathe in building construction.

It is claimed that there is much greater adhesion of the plaster to gypsum board than to ordinary wood lathe and therefore less danger of cracking due to inadequate plaster anchors. The retainer strips are fastened to wood studdings by nailing through the center groove and to steel stud channels by means of clips on the solid back flanges.

Fig. 1, is a photograph showing a corner panel formed of gypsum board held in place by the retainer strip and illustrating how the scalloped edge of the retainer strip acts as a plaster anchor over the joint, while the plaster board is firmly held on all four edges by the groove in the retainer strip.

This section presents some interesting phases of cold roll forming, inasmuch as it was rolled complete with scalloped edges in one pass through the rolling machine at the rate of 100 ft. per minute and held within close limits for straightness in all directions. It was also desired that the rolls be designed to permit making retainer strips without the scalloped edge, if required.

Fig. 2, is a cross section sketch of this retainer strip, which was formed both from planished stock and black finish strips 3-11/32" wide by .020" thick, in lengths up to 12 ft. It was also run from coil stock into long lengths cut to finished lengths afterward on a high speed cutoff, either toothed saw or abrasive wheel type.

Fig. 3, is a photograph of the cold roll forming machine used for this section. The main frame was made long enough to take in eleven stands, but only nine of which are required for this particular job. Machine is of standard construction, having 1½" shafts, 4-1/8" dia., rolls 8" horizontal centers and having a roll space on the shafts of 6". Outer bearings, of a quick removable type, are mounted on the guide support platform.

In order that the scalloped edge be of uniform width, the width of black stock must be held within close limits and without camber and in turn necessitating almost micrometer adjustment of starting guides to correctly align stock with the first set of rolls.

The shearing and forming of the scalloped edge is done simultaneously in the ninth set, but the use of an intricately built up roll embodying forming rolls with shearing edges designed to allow for grinding on faces and return to proper positioning.

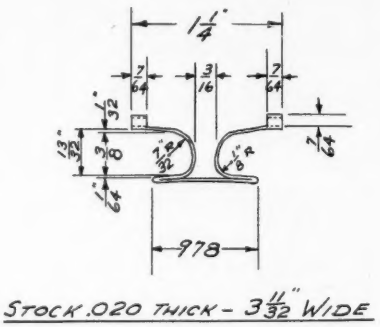


Fig. 2. Cross Section of Strip.

A trial run of 50,000 ft. of stock was made before the machine was shipped and cutters showed no signs of dullness and the sheared edges showed a clean cut.

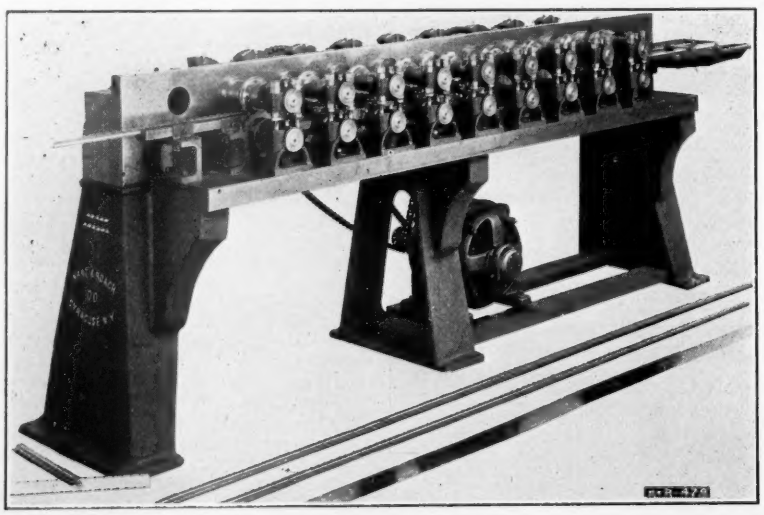


Fig. 3. Cold Roll Forming Machine.

Exports and Imports of Wire

Exports of iron and steel wire products in February and March, 1931
(In gross tons)

	March 1931	February 1931	March 1930
Wire rods	3,594	3,363	4,684
Hoops, bands and strips	3,778	3,797	6,331
Plain wire, iron or steel	1,101	1,162	2,729
Barbed wire and woven wire fencing	2,163	2,179	3,319
Woven wire screen cloth	433	99	136
Wire rope	272	276	295
Insulated wire and cable	25	33	111
Other wire and manufactures	401	471	743
Wire nails	670	561	853
Nails other than wire	324	256	434
Tacks	29	35	40
Bolts, nuts, rivets, except track	519	434	977
Total, these 12 classifications	13,309	12,666	20,652

Imports of iron and steel wire and wire products into the United States
(In gross tons)

Wire rod	455	1,038	1,355
Concrete reinforcement and other bars	9,264	6,609	3,504
Barbed wire	502	403	312
Round iron and steel wire	195	389	485
Steel telegraph and telephone wire	9	2	—
Flat wire and strip steel	65	63	132
Wire rope and strand	247	89	225
Hoops and bands	1,841	1,248	1,721
Other wire	96	73	64
Nails, tacks and staples	676	625	444
Bolts, nuts, rivets and washers	167	92	22
Totals, these 11 classifications	13,507	10,631	8,234

FOREIGN Trade Opportunities reported by the Bureau of Foreign and Domestic Commerce during the month of May, included inquiries for wire or wire products from the following sources: Nails, bolts and nuts (51418) Alexandria, Egypt; pressed steel pulleys (51387) Vancouver, Canada; mild steel hoops for sealing cotton bales (51419) Cairo, Egypt; steel wool (51344) Oslo, Norway; wire netting (51421) Multan, India; ingot strippers and tongs (51353) London, England; copper wire bars, ingots and wire rods (51447) Geneva, Switzerland; collapsible tube and tin pot making machinery (51507) Calcutta, India; soldering and welding machinery and equipment (51576) Vienna, Austria; buckles, belt and metal novelties (51516) Buenos Aires, Argentina; lead, copper, and brass in bars and ingots (51635) Riga, Latvia; screen wire cloth, green or black enameled, and galvanized finish (51822) Tokyo, Japan.

EXPORTS of iron and steel products from the United States in March rose 18,300 gross tons to total 109,512 tons—the highest total for any month since November, 1930, and breaking the steadily downward trend observable in this trade since that month. The chief items exported, in point tonnage, were scrap, plain shapes, tin plate, skelp, and steel bars. The shipments to Japan included 1,265 tons of wire rods, while the shipments to Canada included 11,031 tons of scrap.

EXPORTS of Iron and Steel Wood Screws amounting to 157,327 gross valued at $18,998 were nearly 30,000 gross greater than in February while the trade in Brass Wood screws—9701 gross valued at $2903—was also much greater than in February.

IMPORTS for March were 44 per cent larger than those in February. Belgium was the chief participant, increasing its total to 11,979 tons which included 2,321 tons of merchant steel bars, and 2,207 tons of concrete reinforcement bars. Germany was second with 9,122 tons and 1,028 tons of merchant steel bars were included in the 3,772 ton total from the United Kingdom.

(*Please turn to page 263*)

Steel reels

last longer

Constructed of corrosion resisting materials, three to four times the life of a wooden reel is a reasonable expectancy. The cost of a "Red Head" Reel is less than twice the cost of a wooden reel.

reduce freight

Appreciably lighter than wooden reels, "Red Head" Reels cost less to Ship— a cumulative saving that more than offsets increased first cost.

reduce investment

The longer life of "Red Head" Reels reduces the investment in reel equipment.

reduce repairs

Service records show that wooden reels require frequent repairs and rebuilding. With "Red Head" Reels such repairs have been radically reduced.

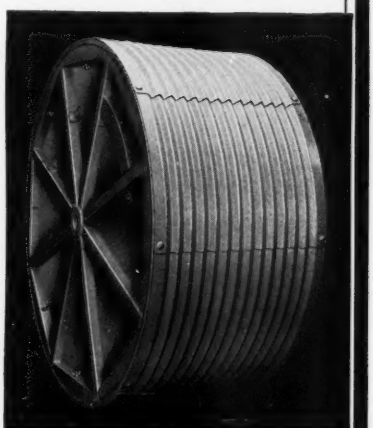
increase protection

Smooth inner surfaces: Much greater strength with the absence of all cutting or abrading projections—these protect not only the cable but the men handling it.

Copy of results of comparative tests will be furnished upon request.

"You are cordially invited to visit our exhibit in booths 44 and 45 at the Wire Show in Cleveland, June 16-19".

"Red Head"



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Under license arrangement with Electrical Research Products, Inc. Subsidiary of Western Electric Company, Incorporated.

New Wire Die Material

Tantalum Carbide Base Metal Shows Satisfactory Performance

A NEW metal for wire dies has recently been developed by the Ramet Corporation of America, North Chicago, Illinois, subsidiary of Fansteel Products Company, Inc., and is now undergoing interesting tests in several leading plants.

This new metal, Ramet, (basically tantalum carbide, is one of the hardest metallic substances known, closely approaching the diamond. It is dense, close grained, and considering its hardness, possesses remarkable toughness and strength. An interesting characteristic is its extremely high melting point, approximately 7950 deg. Fahrenheit, the highest of all substances except carbon.

Metallic carbides have been a subject of interest and study to Dr. C. W. Balke, director of research at the Fansteel plant, since 1904, when he determined the atomic weights of tantalum and columbium. Later, in the Fansteel laboratory, he perfected processes for refining these metals in a pure, ductile state, in commercial quantities. Production of pure tantalum is now one of the chief activities of the Fansteel company.

In 1915, Fansteel produced successful carbide cutting tools, but due to press of other business, the innovation was not pushed. Since the fall of 1929, however, Dr. Balke has given practically his entire time to this matter, making and testing more than 300 lots of hard metals, consisting of carbides and borides of tungsten, tantalum, columbium and molybdenum.

His objective was to produce a metal of extreme hardness and toughness, having characteristics which would overcome the difficulties experienced with other hard metals. As a basic material, tantalum seemed to offer the best possibilities. The characteristics of tantalum—its high melting point, its complete inertness to almost all chemical reagents and other inherent properties influenced Dr. Balke's decision in favor of tantalum carbide. Tests have fully confirmed his judgment.

As used in wire drawing dies, Ramet has a Rockwell hardness of 90.5 on the so-called "A" scale. Its ultimate tensile strength is 250,000 lbs. per sq. in. and over.

RAMET is made from tantalum refined from the Australian ore at the Fansteel plant. The metal is converted to carbide powdered with certain other ingredients added, then pressed into blanks or other desired shapes. Sintering in electric furnaces converts the pressed powder into a cohesive metallic substance. Careful control of grinding and sintering processes produces fine texture and freedom from "voids".

Ramet (tantalum carbide) dies are being tested in several leading mills. The large die at left is for drawing high carbon steel wire. ✦ ✦

As a die material, Ramet has shown results that compare favorably with those of diamonds.

Ramet dies will be marketed by a few licensed die manufacturers, who may also sell Ramet blanks to mills preferring to cut and finish their own dies. Unfinished blanks are also obtainable direct from the Ramet Corporation, as are bars, rods and specially molded shapes.

For wire guides or wearing surfaces where resistance to abrasive wear is important, this metal offers interesting possibilities.

Special R. R. Fares to Convention

The Central Passenger Association carriers have authorized the following special fares for round trip on the Certification Plan, from their territory, which embraces practically all points of residence of our members and friends. These fares are also available to dependent members of your family as well as yourself—we hope a large number will avail themselves of these rates so that we will be accorded the same courtesy each succeeding year.

(a) Round trip tickets will be sold at one and one-half fare (with minimum of $1.00) for the round trip, on Identification Certificate Only—tickets will be good only via same route in both directions. Round trip tickets will be sold from June 11 to 17 inclusive, and before being honored for return passage, return portions must be validated (in space provided thereon) at Cleveland, O., by ticket agents' dating stamp at the regular ticket offices of the lines over which the ticket reads into Cleveland from June 15 to 25 inclusive, and when validated, tickets will be good for return, leaving on any day within final limit; passenger must, however, reach original starting point within limit shown on ticket but in no case later than midnight of June 25, 1931.

(b) One and three-fifths fare for round trip on Identification Certificates, return limit thirty days in addition to date of sale. Selling dates and other conditions to apply same as in paragraph marked (a).

(c) For tickets via diverse routes—see your local ticket agents for explanation.

You must present and surrender to the ticket agent the Identification Certificate issued on account of our activities, and these can only be secured through our Association, so please advise Richard E. Brown, Sec'y, The Wire Association, 551 5th Ave., New York, at once how many certificates you will need.

Straight Line Cleaning House

(*Continued from page 231*)

and carried in non-corrosive metal baskets, and large parts carried directly on the crane hooks, providing that the straight line arrangement of tubs is used.

THE schematic layout shown in Figure 1 and the photograph (figure 2) shows the method used by a large manufacturer of nuts and bolts. The rod is brought in from either storage or railroad cars in 3,000-lb. lots by means of the "hair-pin hook" carrier (figure 3) which runs on a tramrail at a high elevation. The carrier moves over a scale into the tramrail, so that the load can be weighed without rehandling. It is then set down on a portable rack which is always within reach of the cleaning house crane operator. This crane carries the material through process as described above and sets it down on another rack when it is finished. It is then accessible to the "hair-pin hook" operator, who takes the clean rod, still in 3,000-lb. lots, either to the wire drawing machines or the headers, as the case may be.

In this particular installation a single hook crane was used, which permitted swivelling of the load. The use of non-corrosive "hair-pin hooks" through the cleaning process made this practicable.

In some plants however, the crane has been designed with two hooks which will take hold of each end of a suitable wooden pin on which the bundles of rod are supported.

MASTER WIRE DIE CORPORATION

IS PLEASED TO ANNOUNCE THE APPOINTMENT OF

MR. F. M. WOODFORD

AS GENERAL MANAGER

WITH HEADQUARTERS AT 408 CONCORD AVE., N. Y.

JUNE 1, 1931

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Barb Wire Bale Tie Machines
Block Stripper Wire Spool

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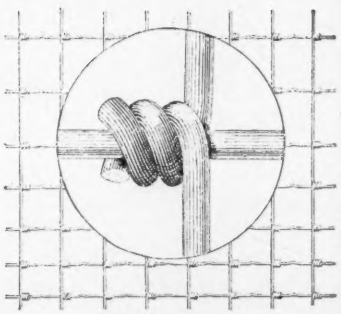


MACHINES IN SUCCESSFUL OPERATION IN SIX DIFFERENT COUNTRIES.

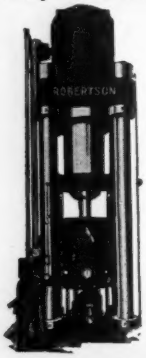
Pioneers . . . . . in Lead Cable Encasing Machinery

It is not without significance to you that our founder, John Robertson, was in his way a true pioneer, making and designing Lead Extrusion Machinery as early as 1842. Then came the telegraph and telephone, together with the commercial application of electric power—with a resulting expansion of wire and cable industries.

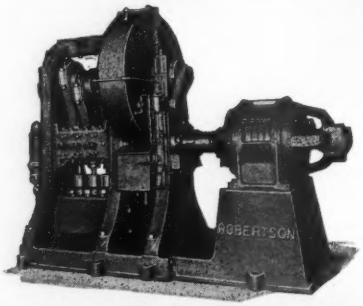
To this expansion the lead presses of John Robertson contributed much; and during the past fifty years, many vital advances in design have been made to cope with the enormous demand for lead-encased wires and cables.

So that today virtually all of the lead-encased cable manufacturers in the United States and Canada, as well as many in England, Europe, and Japan, use Robertson lead encasing presses and equipment.

Thus it is with every assurance of satisfying you that we ask you to let us figure on your requirements. Write us.



Lead Cable Encasing Press



The Improved Robertson High Pressure Hydraulic Pump

John ROBERTSON CO. INC. Pioneers-Since 1858

123-131 Water Street Brooklyn, N.Y.

Wire Manufacture And Lead Patenting

(*Continued from page 227*)

for any desired furnace atmosphere. A pyrometric control is employed to automatically maintain the correct temperature in this furnace. An expanding element, set in the top of the furnace, actuates an on and off valve in the gas supply line. This valve, however, has a small by-pass so that the burners are kept lighted until the temperature has dropped sufficiently to cause the valve to be reopened. A chart of the temperature fluctuations is kept with a recording pyrometer.

AT the charging end are 30 swifts and a corresponding number of blocks at the discharge end, set in two long rows. Thus 30 wires are drawn through the furnace at a time, the blocks being motor driven through a single shaft and speed reduction gear train. All wires are air patented and the higher grades are also lead patented. When using the former process only, the wires travel straight out of the furnace and over the lead bath, but if both processes are desired, a bar is laid over the wires and they are pressed down so that they run through the molten lead.

AIR patenting temperatures vary from 1650 to 1700 deg. F., depending upon the quality and size of wire and the work for which it is intended. The heating periods are variable, but after the wires are treated, the grain structure is as nearly sorbitic as it is possible to get it. The lead bath is carried at about 700 deg. F. minimum, and is equipped with a recording pyrometer. It is necessary to patent some rods before they are drawn, others have to be patented after two draws and then they are good for 4, 5 or 6 more draws.

EVERY coil of wire is given tension and torsional tests and some grades are also given bending and fatigue tests. Tensions run from 150,000 to 300,000 lbs. per square inch, according to grades, with 2 or 3% elongation and 45-55% of reduction of area.

(*Continued from page 248*)

THE rope department contains three lineups each including spooling, stranding and closing setups. First come the batteries of spoolers where the wire is unwound from coils and rewound on steel spools. These spools are then put into the stranding machines. Ropes containing 7, 19, 25 and 37 wires are formed and then these are closed, in closing machines, both the vertical and horizontal types being used.

✦ ✦ ✦

INDIUM

The world's first pound of one of the rarest metals, indium, has now been made electrolytically by the Grasselli Chemical Company in Cleveland, Ohio.

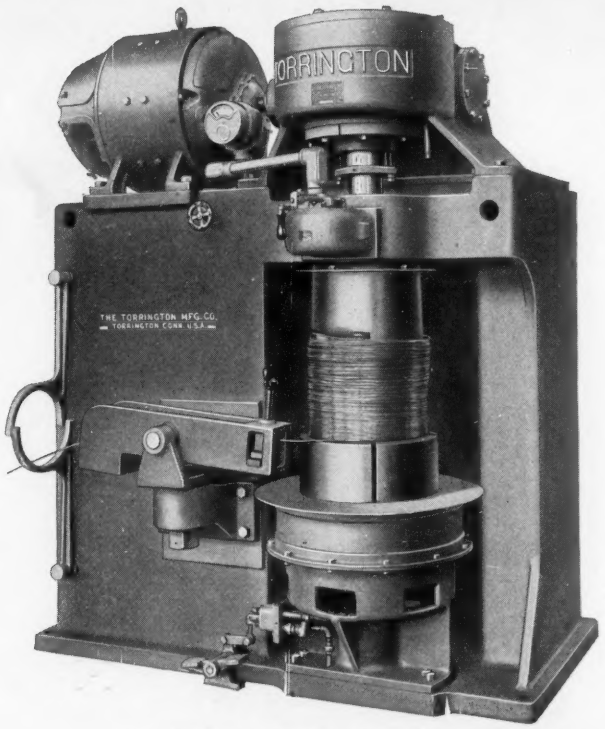
Indium is a white, lustrous metal, very soft and ductile, melts at 155° C., boils at 1450° C., and is slightly heavier than zinc. In fact it resembles zinc in some respects, and aluminum and iron in others. It does not tarnish appreciably in air at ordinary temperatures, but oxidizes rapidly above its melting point, burning with brilliant violet flame at higher temperatures.

Indium has not yet been found to predominate in any mineral, but occurs rather widely distributed in minute amounts in the majority of zinc blendes, in some tin ores, pyrites, siderites and tungsten ores. The Freiburg zinc blende was reported to contain 0.1% of indium; the other known sources usually contain much less.

So far, commercially, it has remained a laboratory curiosity. However, this was once true of helium and many other elements. There is already a British patent covering its use in bearing metal. The fact that a new process makes indium available should stimulate interest in its practical applications. It may be found to have a definite field of usefulness.

✦ ✦ ✦

Newell S. Thomas, 49, assistant treasurer of the Rome division of the Revere Copper and Brass Corporation, died suddenly in his office at Rome, N. Y., on April 24th.



NO. 1382 INVERTED WIRE BLOCK

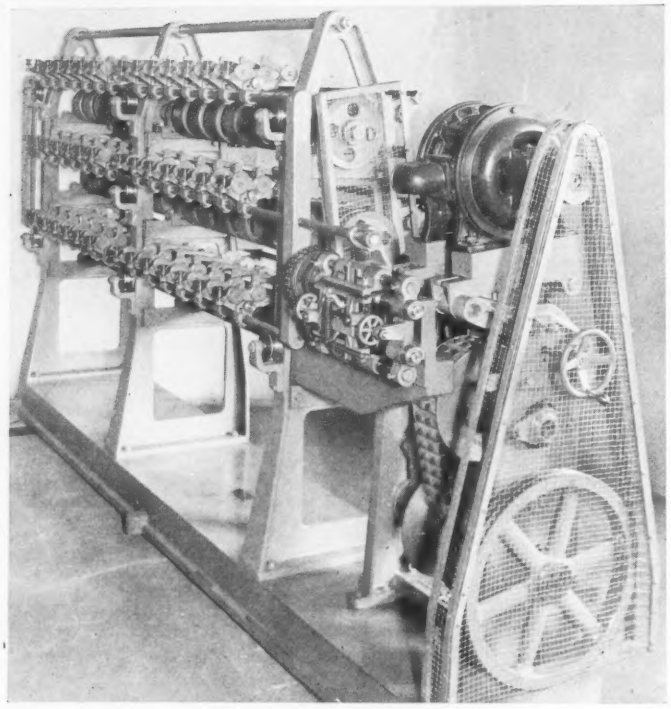
A single die wire drawing machine of the suspended block type with coil with-drawn without the necessity of lifting over top of block. Special two-piece drawing block in combination with receive table for long lengths. Machine is driven by motor located on top of pedestal through worm and worm gear. Full electrical control provided, including slow initial starting speed, converting automatically to a predetermined and adjustable drawing speed. Instantaneous stopping upon completion of draw or in case of broken wire. Safety switch provided. All electrical control equipment enclosed in base of pedestal. The block made in three sizes with any block diameter up to 24".

MACHINERY FOR THE MANUFACTURE OF SHEETS, STRIPS, TUBES, ROD, WIRE AND CABLE

The Torrington Mfg. Co.
Torrington - Conn, U.S.A.
44 Franklin St.

Rod, Wire, Cable, Strip and Tube Machinery

Built To Your Own Specifications



42 Wire Spooler
For Use With Multi-Strand Bright Annealing Furnace

WE BUILD

Chain Draw Benches—Multiple Coil Winders.
Flat Wire Rolling Mills—Rod Pointers.
Hollow Wire Straighteners and Equipment.
Multiple Strand Bright Annealing Units.
Stranders to Customers' Specifications.
Reelers and Spoolers for all sizes of Wire and Cable.
Reelers and Spoolers for Tinning, Galvanizing, Patenting and Annealing.

Frederick M. Conran

Designer and Builder of Special Machinery

107 Colden St., Newark, N. J.

Black Coloring of Wire Products

(*Continued from page 229*)

By slowly removing the articles from the dipping bath all drop formation can be avoided.

When lacquering wire tacks, upholstery pins and the like it is also endeavored to carry out this work in masses. The dip lacquering can in this instance however not be used. For such cases lacquering in the drum would be considered ideal if certain difficulties did not arise therein. These can however for the most part be overcome if in this process and in the arrangement of the drum the kind of article to be lacquered is sufficiently considered. Above all the whole proceeding must be carried out under heat so that the lacquer can run easily and thinly and the superfluous lacquer drips off to a sufficient extent. Consequently the articles to be lacquered must be previously heated, the lacquer must be used hot and the drum must run in a heated atmosphere. The shape of the drum is preferably conical so that the articles supplied at the wide end are gradually transported to the narrow end owing to the rotation of the drum and are delivered at this narrow end almost dry as the drum rotates in a heated atmosphere. At the wide end of the drum heated lacquer also flows at the same time in a thin spray from a container into the drum. The drum wall is perforated to enable the superfluous lacquer to flow off. This is collected in a vessel under the drum so that an economical consumption of lacquer is ensured. The rotating speed of the drum as also the feed speed of the lacquer must be adapted to the nature of the lacquer used. A volatile lacquer is not employed as it dries too quickly and would result in the articles sticking together. The final drying is then carried out in a drying furnace.

✦ ✦ ✦

"The Handy Book of Silver Solder", Handy & Harman, New York, N. Y. A book describing the proper selection and use of silver solder. It describes as well the various different sizes, shapes and forms in which this material can be obtained.

X-Ray Application To Wire and Wire Products

(*Continued from page 219*)

wire was composed of a grain structure which had a greater capacity for cold work.

In many forming operations in which round wire is used, failure is invariably found to occur in wires in which the grain structure varies considerably from the surface to the center. This is due to the grains having different capacities for resisting deformation.

A point that the metallurgist must bear in mind is this: X-rays reveal the structure of the matrix just as the microscope discloses the phases present and their physical state. For instance, in the case of a water quenched 0.60% C. spring steel, the microscope shows the type of martensite present, but the X-ray reveals the structure of the matrix, i. e. is the matrix distorted or free of grain distortions, and are the grains distributed at random, etc.

✦ ✦ ✦

Three Steels Now Available for Nitriding

There are now three types of alloy steel which can be nitrided, that is, hardened by the ammonia process which was introduced about three years ago and which has made such rapid progress since. Originally the first steel brought out, as developed in Germany by Knopp's, which was capable of being hardened with ammonia gas and which was called "Nitralloy," contains about 1% aluminum, 1 to 1.25% chromium and about 0.25% molybdenum. It is an aluminum - chromium - molybdenum steel. It was used exclusively for a year or so until the ingenuity of American metallurgists discovered other types.

The two other brands of steel that can be nitrided are an aluminum-molybdenum steel containing about 1% aluminum and 1% molybdenum, and a chromium-vanadium steel which has about 1.50% chromium and 0.40% vanadium, the amount of the latter depending on the carbon content.

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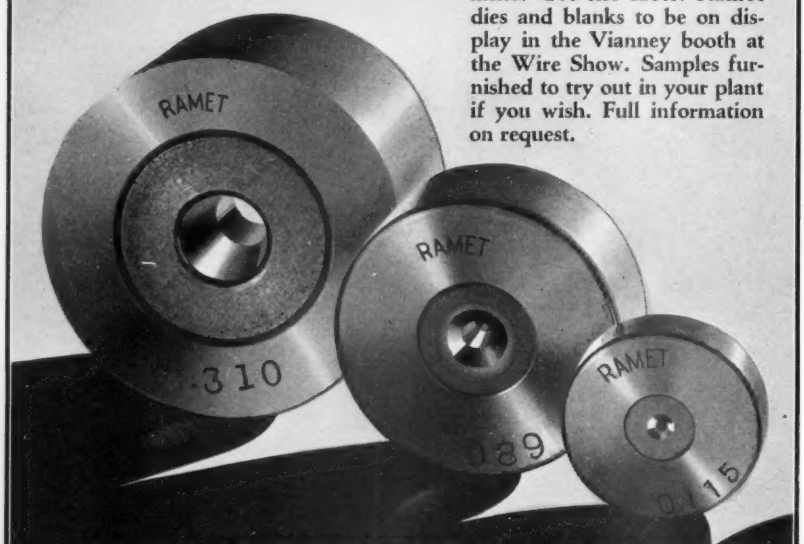
415 Lexington Ave., New York, N. Y.

RAMET DIES

TRADE MARK, REG. U. S. PAT. OFF.

(TANTALUM CARBIDE) Entirely new—making remarkable records in a number of mills. Get the facts. Ramet dies and blanks to be on display in the Vianney booth at the Wire Show. Samples furnished to try out in your plant if you wish. Full information on request.



RAMET CORPORATION *of* AMERICA
NORTH CHICAGO, ILL.
Division of Fansteel Products Company, Inc.

R A M E T
TANTALUM CARBIDE DIES
in Stock in New York for prompt delivery
CORED, ROUGH DRILLED and FINISHED NIBS
any size from .010 to .300 for wire and tubing
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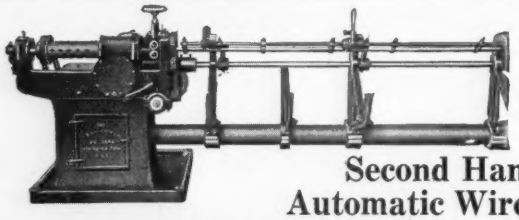

For Sale Cheap
Second Hand Shuster
Automatic Wire Straightener
AS GOOD AS NEW
CAPACITY UP TO ⅜" LENGTH OF RACK 14 FEET.
EQUIPPED WITH ALLIS-CHALMERS 7½ H. P., PATENTED STARTER ELECTRIC MOTOR.
Apply To
CRESCENT BED COMPANY
NEW ORLEANS, LA.

Wire Questions and Answers

(*Continued from page 229*)

Question No. 27

Answer Number 2

The Wire Association:

From our experience in Pittsburgh district, we find that most of the large mills are using a wire drawing grease and with tungsten carbide dies get a very good finish to their wire. Most of this spoke wire is drawn from rod to .270 in a chilled iron or steel die, and then finished to .243 with a tungsten carbide die and a good grade of wire drawing grease. I have seen the two finishes, that is wire drawn through tungsten carbide and that through chilled iron or steel, and there certainly is no comparison.

Question No. 28 Formulae For Making Wire Enamel

The Wire Association:

We would greatly appreciate your advising us where we could obtain a typical formulae for making wire enamel.

Answer

Inquirer was put in contact with several companies one of whom met his requirements.

Question No. 29 Machinery For New Wire Mill

The Wire Association:

Our works are going to put up a new division of galvanized, barbed and fencing wire, also probably multiple drawing machines. We are therefore in need of information for these different types.

Answer

A list of manufacturers of machinery suitable to meet the requirements outlined was supplied.

Question No. 30 Machines For Drawing Tungsten Wire

We would like to know where we can secure a number of machines for the drawing of Tungsten wire. We desire to secure information with reference to the process of drawing wire of this nature.

Answer

A list of manufacturers of such machines was supplied the inquirer. With reference to the subject of drawing Tungsten wire it was suggested that he obtain the following books:

"Tungsten" by Colin J. Smithells, published by D. Van Nostrand Co., 250 Fourth Ave., New York and "History of the Incandescent Lamp" by Howell and Schroeder, published by the Maqua Co., Schenectady, N. Y.

Question No. 31--Wire Weaving Machines ▼ ▼ ▼ ▼ ▼ ▼

We are interested in the subject of Wire Weaving and shall esteem it a favour if you will kindly let us have names of any firms who manufacture wire weaving machines.

Answer

A list of companies manufacturing wire weaving machines for wire cloth was supplied.

Question No. 1--Standardization of Gages ▼ ▼ ▼ ▼ ▼ ▼

This question appeared in the January issue of WIRE AND WIRE PRODUCTS and relates to the standardization of wire gages.

The wide spread interest in this subject is evidenced by the following letter from Percy R. Clark, Managing Director of the Anglia Company, Ploesti, Roumania.

The Wire Association:

I have read with great interest the various suggestions made in regard to the creation of a new wire gage.

Some of these proposals are ingenious, others are elaborate, but it seems to me the essence of good organization is simplicity.

Wire drawers in various English speaking countries would do well, I think, to bear in mind the two following points:

1. That a large part of their products is sold in non-speaking English countries, where the metric system of measurement is in vogue.

2. A wire gauge should be easily comprehensible to the layman. The wire expert can follow any type of gauge.

I would therefore recommend the German system of calculation in tenths of millimetres as the most easily understood. For instance:

I.S.W.G	Diam. in inches	Approx. diam. in m/m	German gauge No.
14	.080″	2.0 m/m	20
19	.040″	1.0 m/m	10
25	.020″	0.5 m/m	5

I beg to remain,

Yours faithfully,

Percy R. Clark.

HUDSON WIRE CO.

Successors Royle & Akin

Fine Wire Manufacturers

OSSINING Established 1902 NEW YORK

Manufacturers of Fine Bare Wires

Copper Wire Specially Processed for Enameling Purposes

Copper	Lead
High Brass	Zinc
Low Brass	Commercial Bronze
Pure Tin	Phosphor Bronze
Cadmium	Silver Plated Copper
Bronze, Various Grades	False Gold

10%, 18%, 30% Nickel Silver

LAHN

False Gold Copper Silver Plated Copper

BRUSH WIRES CRIMP and STRAIGHT

Brass Copper
Steel Nickel Silver
Phosphor Bronze

Metallic Fibre for Packing Purposes

K W

THERE IS A DIFFERENCE IN DIAMOND DIES

The quality of the stone—the shape of the die—the method of mounting. All contribute to the drawing qualities and the production delivered by the die.

KOEBEL-WAGNER DIAMOND DIES

are built from the best quality of diamonds, designed with shapes to give maximum production and securely set in a firm setting that will outlive the die itself.

Koebel-Wagner diamond dies will draw any metal that is suitable to diamond die drawing and do it with economy, speed and uninterrupted production.

LONG WEAR—SMOOTHNESS—
ACCURACY AND HIGH PRODUCTION

Main office and factory

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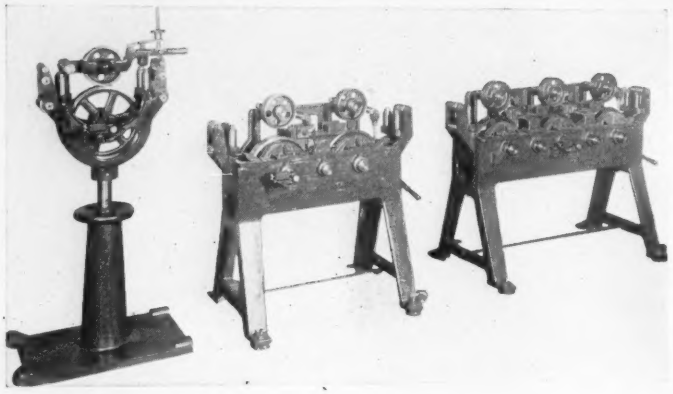
144 ORANGE ST., NEWARK, N. J.

Branches:

New York—Indianapolis—Detroit—Chicago—Cleveland

MEASURING MACHINES
FOR WIRE ROPE AND CABLES

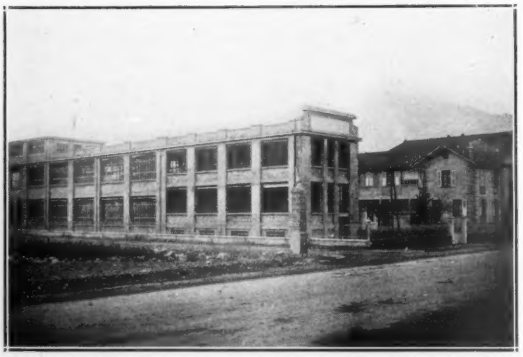


We also manufacture

Cabling Machinery High Speed and Planitary
Standard Planitary Stranding and Closing Machines
Special Flat Strand and Lock Coil Machines
Improved High Speed TUBE Stranders
Patent Machine Stop and Signal
Special Machines Designed Enameling Machines
Improved High Speed SNAKE Stranders
Improved Spooling and Winding Machines
Continuous Wire Drawing Machines
Automatic Coiling Machines

W. E. SOMERVILLE & CO.
Coal City, Illinois

BALLOFFET
1870 — 1931
The Quality Diamond Dies



Balloffet Diamond Wire Dies Co., Inc.
13-15 East 22nd St., New York City
PLANTS AT
New York Lagnieu (France) Cluses (France)
Trevoux (France)

New Aluminum Alloy

The U. S. Reduction Company, East Chicago, Ind., refiners of aluminum and manufacturers of aluminum alloys, has brought out a new aluminum alloy. The alloy, it is claimed, is highly resistant to the action of the elements and tests have shown it to maintain a brilliant lustre and smooth surface under the most severe conditions. In addition to its lightness it is recommended as a metal casting freely and solidly, machining easily and polishing to a bright finish. The alloy will be produced and sold under the trade name of USCO No. 99.

✦ ✦ ✦

Another New Aluminum Alloy

Apex Smelting Company, Chicago, announces a new aluminum alloy sold under the name of "Perm-Brite." This alloy is said to be radically different in composition than aluminum alloys now in common use.

The specific gravity is under that of pure aluminum, aluminum alloys of the silicon group, and is almost 10% lighter than No. 12 alloy. The weight per cubic foot is 163 lbs., per cubic inch 0.094. The high strength attainable is indicated by tests in sand cast specimens ranging from 24,000 lbs. to 26,000 per square inch.

This metal is said to have an elongation of from 6 to 8% in 2 inches in sand castings, and up to 23% in the rolled state. Combined with its light weight and high strength are added factors of corrosion resistance and fine surface, which lends itself readily to polishing and plating.

Tests so far have proven "Perm-Brite" to be non-corrodible to atmosphere, in sea-water, and many different acids.

"Perm-Brite" can be rolled, forged, drawn, hot and cold worked, and investigations are now being conducted in the extrusion field.

✦ ✦ ✦

Come to The
Wire Association Meeting
At Cleveland, O.
June 15th to 19th, inclusive

General Electric's New Wire Plant To Make Filament

The new wire plant of General Electric Company which is being erected at South Euclid, Ohio, is rapidly nearing completion. It is costing about $1,000,000 and is to be devoted to the manufacture of filament wire. Tentative production schedules call for an output of more than 300,000 miles of filament wire during 1932, which can be increased if necessary. Approximately 500 workers will be employed in the new plant which is expected to be completely equipped and ready for operation by December 1st, next.

✦ ✦ ✦

New Aluminum Alloy Used In Germany

An aluminum-tungsten alloy called "Benit," is being commercially produced in Germany and was developed by a French metallurgist, F. Benit. An American patent, No. 1,680,004, has been granted. The alloy contains 96.-91% aluminum, 2% copper, 0.45% magnesium and 0.27% tungsten. The alloy is stated by the maker to show tensile strength of 30 kg. per sq. mm. and an elongation of 23%. It is claimed that it may be remelted without impairing its physical and mechanical characteristics. It can be forged, wedged, drawn or stamped and lends itself readily to both hot and cold working.

WIRE DRAWING DIAMOND DIES
IN NICKEL STEEL SETTINGS
also Composition Dies

Manufacturers for Over 35 Years
(Originators of the Steel Setting)
F. KRAUSE & CO., Inc.
250-252-Ogden Ave.
JERSEY CITY, N. J.

COMING EVENTS

June 8-12—54th Convention and Exhibition, Nat'l. Elec. Lt. Assn., Atlantic City, N. J.

June 15-19—Second Annual Wire Assn. Show and Convention, simultaneously with Iron & Steel Exposition, Public Auditorium, Cleveland, O. Richard E. Brown, Sec'y. Wire Assn., 551 Fifth Ave., New York.

June 22-26—American Society for Testing Materials—Annual meeting, The Stevens Hotel, Chicago. C. L. Warwick, Engineers' Club Bldg., 1315 Spruce St., Philadelphia, Pa.

Sept. 1932—Joint Meeting, Iron & Steel Inst. (Great Britain) and Amer. Inst. Mining & Matt. Engs. Technical sessions in New York. Visits to Bethlehem, Pa., and Pittsburgh, Pa., Washington, Youngstown, Detroit, Cleveland, Chicago, Niagara Falls, Hamilton, Toronto, Montreal, also to Lake Superior mining region, via. Duluth.

The Dominion Foundries and Steel Company has begun a tonnage to British Columbia by way of the Panama Canal. Heretofore the steel requirements of the Canadian northwest have been supplied by British producers.

Wright's Ropes, Ltd., To Manufacture Its Products in Canada

Wright's Ropes, Ltd., of Birmingham, England, one of the foremost wire rope manufacturers of Great Britain, will now manufacture all products for Canadian sales at the plant of the Vancouver Wire Rope Works, Ltd., on Industrial Island.

Announcement of this new industrial development was made by Gordon Chutter, who has been appointed managing director of Wright's Canadian Ropes, Ltd. This new Canadian branch of the Wright company of Birmingham, England has acquired the Vancouver Wire Ropes Works, Ltd., formerly operated by William Cook & Company, Ltd., of Sheffield.

Wright's Canadian Ropes, Ltd., intend to manufacture all wire rope sold in Canada at the Industrial Island plant. Distribution of the product in British Columbia will be through Marshall-Wells, B. C., Ltd.

W. H. SPOWERS, JR.
551 FIFTH AVE., NEW YORK CITY
CONSULTING ENGINEER
SPECIALIZING IN GALVANIZING

PLANTS DESIGNED
AND INSTALLED

Practical Engineering Advice

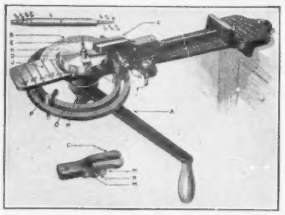
Vanderbilt 3-7395

Kilmer's LITTLE GIANT Wire Former

Forms Eleven Sizes of Eyes from Flat, Round, Square, or Half-Round Stock, also almost any shape desired QUICKLY AND EFFICIENTLY.

Adjustable for No. 3 to No. 24 Gage Wire. The cut on the left shows a few of the thousands of the forms made on this FORMER.

Price $50.00



Patented April 2, 1918

LITTLE GIANT Wire Straightener

Adjustable Wire Reel Price $12.00

Simple, easily adjusted and moderately priced, embodying necessary features to rapidly straighten wire at a minimum cost. Straightens and cuts No. 8 to No. 18 wire to any length. Strongly Constructed. Easily Operated. **Price $85.00.**

Patents Pending

Appointments may be made at Wire Association Booth during Show.

M. D. Kilmer & Company
6001 Quimby St., CLEVELAND, OHIO, U.S.A.

ELECTRIC and FUEL FURNACES

for

Ferrous and Non-Ferrous Wire Products

Complete heating equipment for strand annealing, billet heating and intermediate operations.
Bright annealing furnaces for ferrous and non-ferrous metals.

"Furnace and Fuel to Suit Conditions"

BETTER HEATING W. S. ROCKWELL CO. INDUSTRIAL ESTABLISHED 1888 FURNACES NEW YORK LOWER COST

W. S. ROCKWELL COMPANY

Industrial Heating Equipment

1885-1 50 Church Street (Hudson Terminal Building) New York

WIRE DRAWING Machinery and Equipment

Rod Frames—16" Frames
8" Frames—Take-Up Frames
Wire Pointers—Puller Tongs
General Castings for Wire Mill Use
Circulars on Request.

E. J. SCUDDER FOUNDRY & MACHINE CO. TRENTON N.J.

Copper Smelter and Refinery In Sweden

Development work at the properties of the Boliden concern (Sweden) is proceeding, and by the end of 1931 the copper plant at Ronnskar will be in a position to treat 150,000 tons of ore annually. An electrolytic plant, two regenerative furnaces and eight roasting-furnaces are being erected, besides a big storehouse for arsenic. When complete, 300,000 tons of ore can be treated annually, permitting an output of 7,000 tons of copper, 6,000 kilos of gold and 23,000 kilos of silver.

✦ ✦ ✦

Noranda Refinery Cast First Wire Bars at Montreal

Noranda produced its first finished product in its own plant on May 4th when initial wire bars were cast at its Montreal refinery. First shipment of these bars, Noranda's final product, is likely to be made this week, presumably to the fabricating plant of Canada Wire & Cable Company, which is controlled by Noranda.

✦ ✦ ✦

Copperweld Steel Co. Books Orders For 300 Miles of Cable

President S. E. Bramer of Copperweld Steel Company reports company has received an order for approximately 300 miles of Copperweld cable to be used on transmission lines now under construction which will interconnect the Niagara Hudson Power Corporation system in upstate New York with the New York Edison system serving the Metropolitan district.

✦ ✦ ✦

H. J. McGinn Sales Manager of Eaton Axle & Spring Co.

Howard J. McGinn, vice president and general manager of the Reliance Manufacturing Co., of Massilion, O., has been appointed vice president in charge of sales of the Eaton Axle & Spring Co., which recently acquired the Reliance company. President W. H. Crawford will remain in charge of Reliance operations.

Canada Wire and Cable To Start About June 1st

Canada Wire & Cable Company's new plant in Montreal East has been completed and will be in operation early in June.

Equipment has been installed to roll copper rods, draw wire and carry out other finishing operations. Wire bars will be received from the new refinery of Canadian Copper Refiners, which has been in production for several weeks and will be ready to deliver bars to Canada Wire & Cable's plant when rolling mill operations start.

✦ ✦ ✦

Simplified Practice for Overhead Electric Materials

A simplified practice recommendation covering the packaging of 20 items of overhead electric railway materials was adopted at a general conference of representatives of all interests, held under the auspices of the division of simplified practice of the Bureau of Standards, Department of Commerce, on May 7, 1931, at Pittsburgh, Pa.

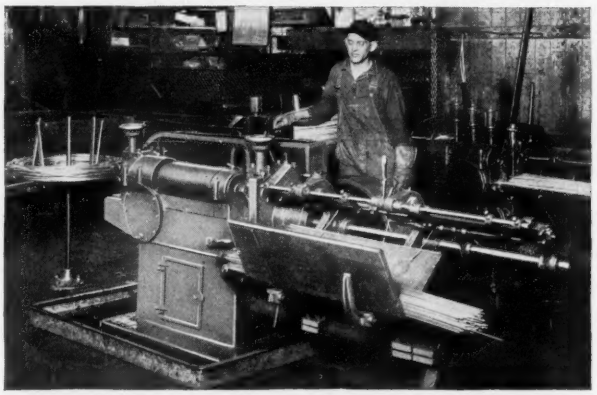
Recommendations were made for the packaging of the following materials: protecting trolley armour, pole bands up to and including 6 inches, pole bands 7 inches and over, fork bolts with insulator ½ inch in diameter, fork bolts with insulator ⅝ inch in diameter, angle crossarm braces, flat steel crossarm braces, crossings or crossovers, trolley wire clinch ears, trolley frogs, straight line hangers, cap and cone insulators, section insulators, strain (Globe & Giant) insulators, wood strain insulators) feeder pins for steel crossarms, straight line suspension pullovers, trolley wire splicing sleeves, (soldered), trolley wire splicing sleeves (mechanical), and line section switches.

✦ ✦ ✦

C. H. Butts, who has been in the operating division of the Newton Steel Company, has been appointed vice president in charge of operations, succeeding **C. B. Pollock,** resigned. **R. L. Ritzie,** manager of the company's plant at Newton Falls in Trumbull County, has been named general manager of both the Monroe, Michigan, and Newton Falls property.

A SHUSTER

AUTOMATIC WIRE STRAIGHTENING AND CUTTING MACHINE—MOTOR DRIVEN



cutting ¼" diameter Bessemer wire into 30-½" lengths for Hood wires in one of the largest motor car plants in the country.

In this plant they install only machines which stand up to constant service day after day, and that Shuster Machines do this is shown by their repeat orders.

May we tell you more about them?

The F. B. Shuster Company **New Haven, Conn.**

Straightener Specialists Since 1866

VIANNEY

DIAMOND DIES

See Our Exhibit At the Wire Show.

June 15th-June 19th Inclusive At Cleveland Auditorium

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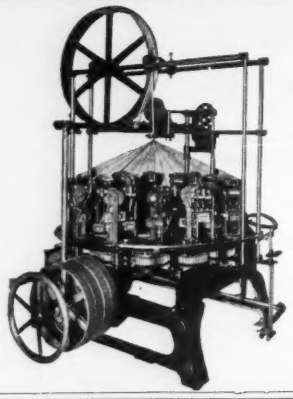

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Multiple Head Wire Covering Braiders

Single, Double or Triple Deck Wire Covering Braiders

Single, Double or Triple Deck Cable Braiders

FIDELITY MACHINE COMPANY

Philadelphia, Pa.

6-UNIT LAYER-WINDING SPOOLER

Single Units or In Gangs

Wire from No. 20 to No. 36 B. & S.
—Spools, to 6-in. heads.
—Cam Traverse, 2½ to 3½ in.
—Change Gears to vary the rate of traverse.
—Automatic Stops.
—Ball Bearing Spindles.

EST. 1855 AIMCo INC. 1915
"American" INSULATING MACHINERY COMPANY
REG. U.S. PAT. OFF.

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WIRE BUNCHING MACHINES
WIRE STRANDING MACHINES
TWINNING MACHINES Up to And Including
SEVEN CONDUCTORS
(Manufactured under the Dawes Patents)

HASKELL-DAWES MACHINE CO., INC.
Ontario St. Below Trenton Ave.,
Philadelphia, Pa.

NEW PRICES NOW!

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BELLET

COMPOSITION AND DIAMOND DIES
315 FIFTH AVE., NEW YORK, N. Y.

Fencing Wire in the Argentine

According to a decision of the Argentine's government farmers are to hedge in their pastures, because on account of the want of labourers it is impossible to watch the large flocks and a special fencing wire is now required.

The ordinary galvanised-iron wire, barbed wire or wire nettings are no longer used, but a more expensive galvanised steel wire, more especially oval wire, B.W.G. No. 12/14, besides B.W.G. Nos. 11/13, 10/12 and 9/11, are being used. These kinds of wire are mainly specified to be of a strength of 120 to 130 kgs. per sq. mm (76 to 82 tons per sq. in.). Sometimes wire of a less strength is offered, but in most cases customers do not accept these offers. The material is ordered, as a rule, in coils weighing 45 kgs. (100 lbs.) that makes 1.390 m. at a thickness of B.W.G. No. 12/14.

The wire forming a coil must be of one length, and not consist of several shorter ends. The coils are generally supplied unwrapped, only a thin wire being wound around the coils. In the Argentine only importers settled in the country, come in question as buyers who deliver the goods to consumers.

In use the wire is fastened on posts in the form of so-called bulb-T fencing standards. These are about 1.80 m. high and are varnished, pointed and contain six or seven holes. The holes only have a diameter of about 3/8 in., and the steel wire must naturally be very supple. It is always specified that the wire must stand 7 or 8 twists round a rod of 10 mm. dia. In a bulb-T fencing standard with six holes these must be placed in the following way (measured from top to bottom): The first hole at the 5th cm., the second at the 25th cm., the third at the 43rd cm., the fourth at the 65th cm., the fifth at the 73rd cm., and the sixth at the 86th cm. In the case of standards with seven holes, these are placed as follow: The first hole at the 5th cm., the second at the 32nd cm., the third at

the 50th cm., the fourth at the 65th cm., the fifth at the 75th cm., the sixth at the 87th cm., and the seventh at the 97th cm. The fencing posts imported into the Argentine are mainly of Belgian origin. The material is supplied in basic-Bessemer quality of a strength of 37 to 44 kg. per sq. mm. (23 to 28 tons per sq. in.), with a 20 per cent elongation (with usual tolerances), pitched and bundled. The weight of one post (standard bulb-T section) is about 13 3/4 lbs.

✦ ✦ ✦

Phillipsdale Gets Worcester Rate

In view of the recently approved reduction on certain wire rods from Worcester, Mass., to New York Lighterage points, a reduction will probably be granted by the New Haven Railroad on wire rods in coils not drawn through dies from the Phillipsdale, Rhode Island, plant of the Washburn Wire Company, to New York Lighterage points north of 115th Street on the New York shore of the East River and Harlem Rivers. Rates apply on open top cars, 56,000 c.l. minimum. The rate will be $3.50 per gross ton against 25 cents per 100 pounds at present. The provision is also made that wire rods arriving at Phillipsdale via New Haven Railroad and reshipped cannot be held over 12 months.

Other rate changes proposed by the New England Freight Association include the following:

Pig iron from New York Lighterage points to Worcester, Mass., present $3.65 proposed $3.05 to make this rate comparable with rates from Boston.

Iron or steel wire from Worcester to Boston, present 16.50c, proposed 11.50c. This rate had been cancelled in error.

Copper bars and tubing from Auburn, R. I., to New York. The present basis is the class rate scale and 22.00c l.c.l. 28.00c l.c.l. is proposed or the same as Providence.

✦ ✦ ✦

Wickwire Spencer To Close Plant At Spencer, Mass.

Wickwire Spencer Corporation will discontinue operations at its Spencer, Mass., plant about June 1st and will transfer the machinery and equipment to other plants.

STEELSKIN

REG. U. S. PAT. OFFICE

For High or Low Carbon Wire

WIRE DRAWING SOAPS

Established 25 years.

R. H. MILLER CO., Inc. Homer, N. Y.

THE MOST RELIABLE

DIAMOND DIES

ON THE MARKET TODAY
USE OUR DIES
FOR SAFE and SUSTAINED PRODUCTION

COCHAUD WIRE DIE CORP'N

Manufacturers of

WIRE DRAWING DIAMOND DIES

Factories: { TREVOUX; Pont-De-Vaux-France
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The crack trains, which pay best, are trusted solely to men, who have learned from—*Experience*

—As wire drawers for over 30 years, we know from *Experience* the particular shape of die for each material. We have found from this same experience that our special casting method of setting is best.

Why not let us quote on your diamond die requirements?

DRIVER-HARRIS COMPANY
HARRISON, N.J.

Chicago – Detroit – Morristown, N.J. – England – France
Cleveland Italy

URDIKA

WIRE DIE WORKS, INC.

129 FULTON STREET, NEW YORK CITY

STEEL SET

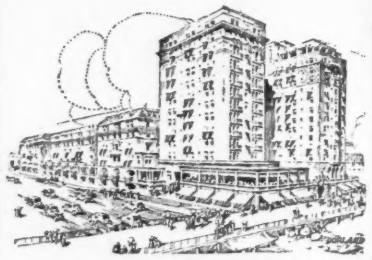
DIAMOND DIES

ALLOY DIES

ACCURATE SIZE

Smooth Draw Highest Quality

The
St. Charles
On the Boardwalk
At New Jersey Avenue
ATLANTIC CITY



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THE ultimate in service with unsurpassed French and German cuisine. Varied entertainment. Dancing. Concerts and recitals. Sun deck. Surf bathing from hotel. European or American plan.

IDEAL CONVENTION FACILITIES

ATLANTIC CITY INVITES YOU—COME!

Hatfield Changes Name to Hatfield Wire and Cable Co.

Effective of recent date, the Hatfield Rubber Works, Inc., became the Hatfield Wire and Cable Company.

Hatfield has always specialized in the manufacture of lamp cords, fixture wires, and radio wires. As a result of their recently added plant facilities they now offer a complete array of rubber-covered and lead-covered cables, with warehouse facilities in 28 strategically located cities.

Hatfield has also installed one of the largest and most modern assemblying departments in the industry, affording all appliance manufacturers the opportunity of purchasing their cords assembled with whatever type of wiring devices their particular needs or specifications require.

"Peroline, Kemick, Deoxodine, Lithoform, Flosol" American Chemical Paint Co., Ambler, Pa. Small leaflet bulletins describing chemical compounds for various industrial purposes.

Roessler & Hasslacher Chemical Company

The Roessler & Hasslacher Chemical Company announces the removal of their Toronto office from Richmond Street West to 372 Bay Street.

"Machinery for the Manufacture of Radio and Other Tubes," Eisler Elec. Corp., Newark, N. J. Catalog C, one of the largest, most complete and most attractive books of its kind. It describes the Eisler concern's machinery for making radio, television, Neon sign, incandescent and other tubes, also other glass products varying from air pressure blowers and ampule exhaust machines down a long list to wire cutting drawing and welding equipment.

"Pickling Made Efficient with A. C. P. Rodine", American Chemical Paint Co., Ambler, Pa. A revised edition of Bulletin No. 15 describing pickling and similar cleaning processes and the application of Rodine to these.

NEW YORK'S NEWEST
NEW! MODERN! LUXURIOUS!
1000 Rooms—1000 Baths
Each room with both private bath and shower, CIRCULATING ice water, servidor
RADIO IN EVERY ROOM
$3 DAILY

SINGLE	$3.00	$3.50	$4
DOUBLE	$4.50	$5.00	$6

In the theatre, shops and business centers
SIDNEY J. MITCHELL, Manager Telephone Circle 8500
NEW HOTEL
VICTORIA
7th Avenue at 51st Street, New York

New Zinc Recovery Process Developed

The Bureau of Mines has completed a process for the production of metallic zinc of more than 99.9 per cent purity at low cost. Details are to be announced in the near future.

Working for the last three years on the general problem of finding improved methods to assist in utilizing the zinc ores available in the western, central and eastern States, bureau engineers have studied chemical reactions, working temperatures and ores giving promise of meeting modern industrial requirements for high grade, low cost materials. Success in an outstanding degree did not reward their efforts until they were able to test the practicability of certain thermoidynamic calculations indicating possibilities in a hitherto undeveloped direction.

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HANDY & HARMAN announce the retirement of John F. Harman as chairman of the board and Joel L. Brush as treasurer, on May 1st.

Mr. Harman celebrates his 87th birthday on this date, and also completes his 64th year with the company. This unusual record is even more remarkable because he served with three generations of the Handy family—first with Parker Handy, his chief; then throughout the lifetime of his partner, the late Parker Douglas Handy; and recently with Cortlandt W. Handy, now president of the company. Mr. Harman is in the best of health and will continue as a director of the company.

Mr. Brush has been with the company since 1930, and has served as treasurer since 1915.

While the firm of Handy & Harman was established in 1867, it is able through the acquisition of the Charles S. Platt Company to trace its business lifetime for a period of 107 years, as the firm of Platt & Bros. began the manufacture and refining of precious metals in New York City in 1824.

Their plants are located at Bridgeport, Conn., Providence, R. I., and New York City.

Broden Construction Co.

Wire Mill and Cold Rolling Equipment

10255 Harvard Ave.
CLEVELAND, OHIO

The Waterbury Wire Die Co.

Diamond, Composition and CHILLED IRON DIES
Waterbury, Conn.

ARTHUR STENNETT MARTIN of Mount Lebanon, Pa., died at Pittsburgh recently at the age of 47 years. He was in charge of the Firthite Depart. of the Firth-Sterling Steel Co. at McKeesport.

Splice with "HANDY" SILVER SOLDERS

Best way of making joints in wire, and rods; for strength, for electrical conductivity, for resistance to vibration, shock or corrosion.

Standardized Compositions

Each "Handy" Solder has its own field of usefulness. Once you have determined the best one to use, you can depend upon every lot having exactly the same qualities.

HANDY & HARMAN
57 William St.,
NEW YORK CITY

HANDY & HARMAN
Precious Metals *Since 1867*

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SERVICE

Without charge or obligation, we will inform you on any questions you may put to us touching on patent, trade-mark and copyright law. You may ask: "Should I protect myself by patent, or register under the trade-mark or copyright laws? What kind of a patent should I obtain?" and many other questions that may occur to you. These are vital points to consider and questions will be cheerfully answered.

Evidence of Conception

Before disclosing your invention to anyone send for blank form "EVIDENCE OF CONCEPTION" to be signed and witnessed. As registered patent attorneys we represent hundreds of inventors all over the United States and Canada in the advancement of inventions. The form "Evidence of Conception," sample, instructions relating to obtaining of patents and schedule of fees sent upon request.

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BUYERS' GUIDE

For more complete information, consult the annual Directory, Index & Buyers' Guide.

ANNEALING FURNACES
See Furnaces—Various Headings

ANNEALING POTS
Columbiana Boiler Co., Columbiana, O.
Scudder, E. J., Fdry & Machine Co., Trenton, N. J.

ARMORING EQUIPMENT
Amer. Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
John Robertson Co., Brooklyn, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

BAKERS
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

BOBBINS
Mossberg Pressed Steel Co., Attleboro, Mass.

BRAIDER CARRIERS
Mossberg Pressed Steel Co., Attleboro, Mass.

CASTINGS—Wire Mill
E. J. Scudder Foundry & Machine Co., Trenton, N. J.

CLEANING & PICKLING EQUIPMENT
Vaughn Machinery Co., Cuyahoga Falls, O.

COPHOLDERS
Mossberg Pressed Steel Corp., Attleboro, Mass.

CRANES—Wire Mill
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

DIES—Chilled Iron
Waterbury Wire Die Co., Waterbury, Ct.

DIES—Composition
Addor Wire Die Works, N. Y.
Bellet Diamond Die Works, N. Y.
Fansteel Products, Inc., Chicago, Ill.
F. Krause, Inc., Jersey City, N. J.
Urdika Wire Die Works, Inc., New York

DIES—Diamond
Addor Wire Die Works, N. Y.
Balloffet Diamond Wire Dies Co., Inc., N. Y. C.
Bellet Diamond Die Works, N. Y.
Cochaud Wire Die Co., New York.
Driver-Harris Co., Harrison, N. J.
Globe Diamond Die Corp., New York.
Koebel Wagner Diamond Corp., Newark, N. J.
F. Krause & Co., Inc., Jersey City, N. J.
Master Wire Die Corp., New York, N. Y.
Union Wire Die Corp., New York, N. Y.
Urdika Wire Die Co., N. Y. C.
Vianney Wire Die Works, New York.
Waterbury Wire Die Co., Waterbury, Ct.

DIES—Lead Extrusion
John Robertson Co., Brooklyn, N. Y.

DIES—Repairs & Re-Cutting
Addor Wire Die Works, N. Y.
Balloffet Diamond Wire Dies Co., Inc., N. Y. C.
Bellet Diamond Die Works, N. Y.
Cochaud Wire Die Corp., New York.
F. Krause & Co., Inc., Jersey City, N. J.
Urdika Wire Die Co., N. Y. C.
Vianney Wire Die Wks., N. Y.

DIES—Recutting and Repolishing Machine
Wm. Haddow, Ossining, N. Y.
F. Krause, Inc., Jersey City, N. J.

DIES—Rod and Tube Drawing
Carboloy Co., Inc., Newark, N. J.
Master Wire Die Corp., N. Y.
Union Wire Die Corp., N. Y.

DIES—Tantalum Carbide
Fansteel Products, Inc., Chicago, Ill.

DIES—Tungsten Carbide
Bellet Diamond Die Works, N. Y.
Carboloy Co., Inc., Newark, N. J.
Fansteel Products, Inc., Chicago, Ill.
Master Wire Die Corp., New York, N. Y.
Union Wire Die Corp., New York, N. Y.

DRAW BENCHES—
Scudder, E. J., Fdry & Machine Co., Trenton, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry & Machine Co., Waterbury, Conn.

DRIVES—V-Belt
American Pulley Co., Philadelphia, Pa.

FLUXES—Soldering
Kester Solder Co., Chicago, Ill.

FURNACES—Annealing
Bellis Heat Treating Co., Branford, Conn.
Chas. F. Kenworthy, Inc., Waterbury, Conn.
W. S. Rockwell Co., New York, N. Y.

FURNACES—Automatic
Bellis Heat Treating Co., Branford, Conn.
Chas. F. Kenworthy, Inc., Waterbury, Conn.
W. S. Rockwell Co., New York, N. Y.

FURNACES—Bright Annealing
Bellis Heat Treating Co., Branford, Conn.
Chas. F. Kenworthy, Inc., Waterbury, Conn.
W. S. Rockwell Co., New York, N. Y.

FURNACES—Electric
Bellis Heat Treating Co., Branford, Conn.
Chas. F. Kenworthy, Inc., Waterbury, Conn.
W. S. Rockwell Co., New York, N. Y.

FURNACES—Lead Melting
John Robertson Co., Brooklyn, N. Y.

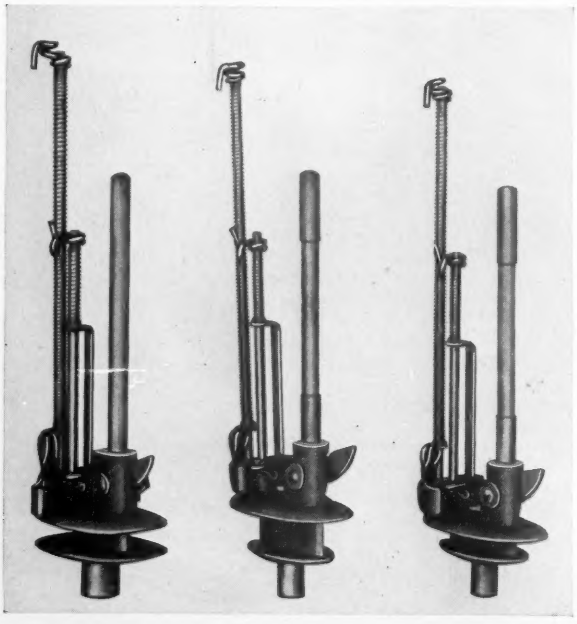
FURNACES—Non-Oxidizing
Bellis Heat Treating Co., Branford, Conn.
Chas. F. Kenworthy, Inc., Waterbury, Conn.
W. S. Rockwell Co., New York, N. Y.

FURNACES—Wire
Bellis Heat Treating Co., Branford, Conn.
Chas. F. Kenworthy, Inc., Waterbury, Conn.
W. S. Rockwell Co., New York, N. Y.

GALVANIZING ENGINEER
W. H. Spowers, Jr., New York, N. Y.

For Higher Speeds and a Better Product

MOSSPEED BRAIDER CARRIERS



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Tell us what machines you use. We will be glad to show you how Mosspeed carriers may be used to increase your profits.

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Attleboro, Massachusetts, U. S. A.
Greenville, S. C. Dallas, Texas
Selson Engineering Co., Ltd., London, Eng.

BUYERS' GUIDE, Continued

GALVANIZING LADLES, PANS, POTS, ETC.
Columbiana Boiler Co., Columbiana, O.

LATHES—Die Reaming
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
The Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

LIME—Pulverized
Amer. Lime & Stone Co., Bellefonte, Pa.

LUBRICANTS—Wire Drawing
R. H. Miller & Co., Homer, N. Y.
J. T. Robertson Co., Syracuse, N. Y.

MACHINE—Die Re-cutting and Polishing
Wm. Haddow, Ossining, N. Y.

MACHINERY—Armoring (Cable, Wire Hose)
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Barb Wire Bale Tie
John A. Holmquist, Aliquippa, Pa.

MACHINERY—Block Stripper Wire Spool
John A. Holmquist, Aliquippa, Pa.

MACHINERY—Braiding
Fidelity Machine Co., Phila., Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt. Co., Providence, R. I.

MACHINERY—Bunching
Amer. Insulating Mach'y Co., Phila., Pa.
Haskell-Dawes Machine Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Bundling
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.

MACHINERY—Cable, Electric
Fred'k M. Conran, Newark, N. J.
New England Butt Co., Providence, R. I.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Company, Paterson, N. J.

MACHINERY—Chain Making
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Closing
Haskell-Dawes Mach. Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Coil Winding
Amer. Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Coiling
Broden Const. Co., Cleveland, O.
Haskell-Dawes Mach. Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Copper Wire Drawing and Rolling
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrell Fdry & Machine Co., Waterbury, Conn.

MACHINERY—Cutting
American Insulating Mach'y Co., Phila., Pa.
Hallden Machine Co., Thomaston, Conn.
F. B. Shuster Co., New Haven, Conn.
Sleeper & Hartley, Worcester, Mass.

MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa.

MACHINERY—Extruding
John Robertson Co., Brooklyn, N. Y.
Watson Machine Co., Paterson, N. J.
Wm. E. Somerville & Co., Coal City, Ill.

MACHINERY—Fence
John A. Holmquist, Aliquippa, Pa.
Watson Machine Company, Paterson, N. J.

MACHINERY—Flat Wire
Fred'k M. Conran, Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Forming
Kilmer, M. D., Co., Cleveland, O.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Galvanizing Wire
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Gang Winders
Watson Machine Co., Paterson, N. J.

MACHINERY—Insulating
American Insulating Machinery Co., Phila.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Lead Encasing Presses, etc.
John Robertson Co., Brooklyn, N. Y.

MACHINERY—Lead Stripping
John Robertson Co., Brooklyn, N. Y.
Watson Machine Co., Paterson, N. J.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Magnet Wire
American Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Measuring Wire
New England Butt. Co., Providence, R. I.

MACHINERY—Nail
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Panning
American Insulating Machinery Co., Phila.

MACHINERY—Pointing
Fred'k M. Conran, Newark, N. J.
Morgan Construction Co., Worcester, Mass.
E. J. Scudder Foundry & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
The Waterbury Farrell Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Rivet
Waterbury-Farrell Fdry & Machine Co.,

MACHINERY—Rod
Fred'k M. Conran, Newark, N. J.
Morgan Const. Co., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrell Fdry & Machine Co., Waterbury, Conn.

MACHINERY—Rubber Strip Covering
American Ins. Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Screw Wire
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Spooling
Fred'k M. Conran, Newark, N. J.
American Insulating Machinery Co., Phila.
Torrington Mfg. Co., Torrington, Conn.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Spring Making
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Staple
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Straightening
Lewis Machine Co., Cleveland, O.
F. B. Shuster, New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Straightening Hollow Wire
Fred'k M. Conran, Newark, N. J.

MACHINERY—Stranding
American Insulating Mach'y Co., Phila Pa.
Fred'k M. Conran, Newark, N. J.
Haskell-Dawes Machine Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Wm. E. Somerville & Co., Coal City, Ill.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

Exports and Imports

(*Continued from page 245*)

RECEIPTS of card clothing totaled 4,167 square feet, valued at $6,455. This was less than one-half as great as in February and was wholly from the United Kingdom. Receipts of wire screening dropped to 11,816 square feet, with Germany, France, Austria, and the Netherlands the chief sources of supply.

FOURDRINIER and other paper making wire rose sharply to 233,842 square feet and included wire from France, Germany, Austria, Sweden, the United Kingdom and Czechoslovakia.

NO wire fencing was imported during March and but 96 tons of galvanized fencing wire. Wire heddle receipts doubled to total 2,473,000 pieces—1,653,000 pieces originating in Switzerland, 500,000 in France, and 320,000 in Germany. The trade in wood screws dropped sharply to 13,428 gross, valued at $1,196 of this amount 12,076 gross coming from Sweden.

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COME TO THE WIRE ASSOCIATION MEETING AND SHOW. JUNE 15th TO 19th, 1931

THE original report on CORROSION RESISTANCE OF AIRCRAFT BRACING CABLES WITH DIFFERENT END CONNECTIONS prepared by DR. MARTIN ABRAHAM, Research Engineer, for the Deutsche Versuchsanstalt Für Luftfahrt will be published in the July issue of WIRE AND WIRE PRODUCTS.

This report gives test results of the greatest importance to manufacturers and users of bracing cables for aircraft and for all other types of open air structures.

BUYERS' GUIDE, Continued

MACHINERY—Strip Steel
Broden Const. Co., Cleveland, O.
Fred'k M. Conran, Newark, N. J.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Swaging
Sleeper & Hartley, Worcester, Mass.
Waterbury-Farrell Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Taping
Amer. Insulating Mach. Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Company, Paterson, N. J.

MACHINERY—Trolley Wire
Torrington Mfg. Co., Torrington, Conn.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube
Fred'k M. Conran, Newark, N. J.
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrell Fdry. & Machine Co., Waterbury, Conn.

MACHINERY—Used
Crescent Bed Co., New Orleans, La.

MACHINERY—Welding
Micro Products Co., Peoria, Ill.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Winding
American Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Drawing
American Insulating Machinery Co., Phila.
Broden Const. Co., Cleveland, Ohio.
Fred'k M. Conran, Newark, N. J.
Morgan Construction Co., Worcester, Mass.
E. J. Scudder Foundry & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Manufacturing Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury Farrell Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Wire Rope
New England Butt Co., Providence, R. I.
Wm. E. Somerville Co., Coal City, Ill.
Watson Machine Company, Paterson, N. J.

MACHINERY—Wrapping Coils
Terkelsen Machine Co., Boston, Mass.

PACKING—Metallic Fibre
Hudson Wire Co., Ossining, N. Y.

POINTERS—Wire
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

POTS
Columbiana Boiler Co., Columbiana, O.

POTS—Lead Melting
John Robertson Co., Brooklyn, N. Y.

PRESSES—Lead Encasing
John Robertson Co., Brooklyn, N. Y.

PRESSES—Lead Extrusion
John Robertson Co., Brooklyn, N. Y.

PULLERS—Wire
E. J. Scudder Fdry. & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.

PUMPS—Hydraulic
John Robertson Co., Brooklyn, N. Y.

REELS AND SPOOLS—All Kinds
R. B. Hayward Co., Chicago, Ill.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.

REEL AND TENSION STAND—
Sleeper & Hartley Inc., Worcester, Mass.

REEL CRUTCHES
R. B. Hayward Co., Chicago, Ill.
Watson Machine Co., Paterson, N. J.

SOAPS—Wire Drawing
R. H. Miller Co., Homer, N. Y.
J. T. Robertson Co., Syracuse, N. Y.

SOLDER
Kester Solder Co., Chicago, Ill.

SOLDER—Silver
Handy & Harman, N. Y.

SPOOLS—Annealing—Detachable Head Handling—Wire Stitching
Mossberg Pressed Steel Corp., Attleboro, Mass.

STEEL—Stainless for Wire
Associated Alloy Steel Co., Inc., Cleveland

TRUCKS
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

VULCANIZERS
Watson Machine Co., Paterson, N. J.

VULCANIZING PANS
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.

WIRE—Various Kinds
Hudson Wire Co., Ossining, N. Y.
Wickwire Spencer Steel Co., N. Y. C.

This is a carefully classified index of concerns who specialize in this industry and who advertise regularly in WIRE & WIRE PRODUCTS. Please mention WIRE when writing to these firms.

WATERBURY-FARREL

TANDEMS

No. 2 5-die machine, block type with stripper and optional floor spooler. Wire finished in coils or spooled, as preferred. Starting size ⅜ in. copper rod, finishing at No. 5 or No. 6 B. & S. gauge. Flexible - coupled enclosed herringbone drive. Antifriction bearings throughout. Aluminum swing cover for dies.

THE CULMINATION OF MORE THAN 25 YEARS AS BUILDERS OF CONTINUOUS WIRE DRAWING MACHINES OF MERIT

The Waterbury Farrel Foundry & Machine Company

HOME OFFICE AND FACTORY:
Cottage Place, Waterbury, Connecticut
WESTERN SALES OFFICE:
Cleveland, Ohio

A machine that meets the present day demand for high speed and maximum production efficiency. The No. 2 machine is built in both 5 and 6-die constructions. The No. 1 tandem machine is built in from 5 to 10-die construction. May we send you our complete catalogue of wire drawing machinery?

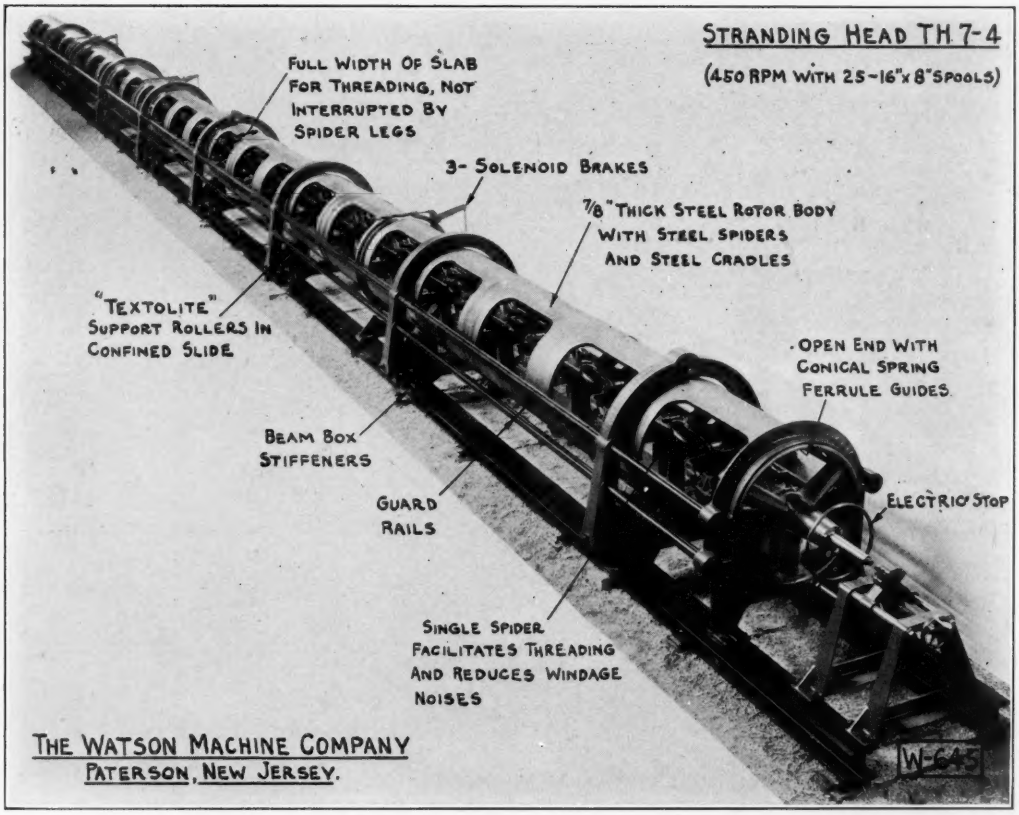
THE WATSON MACHINE COMPANY

ESTABLISHED 1845

PATERSON, NEW JERSEY, U. S. A.

ENGINEERS - FOUNDERS - MACHINISTS

Tubular High Speed (All Steel Rotor) Stranders

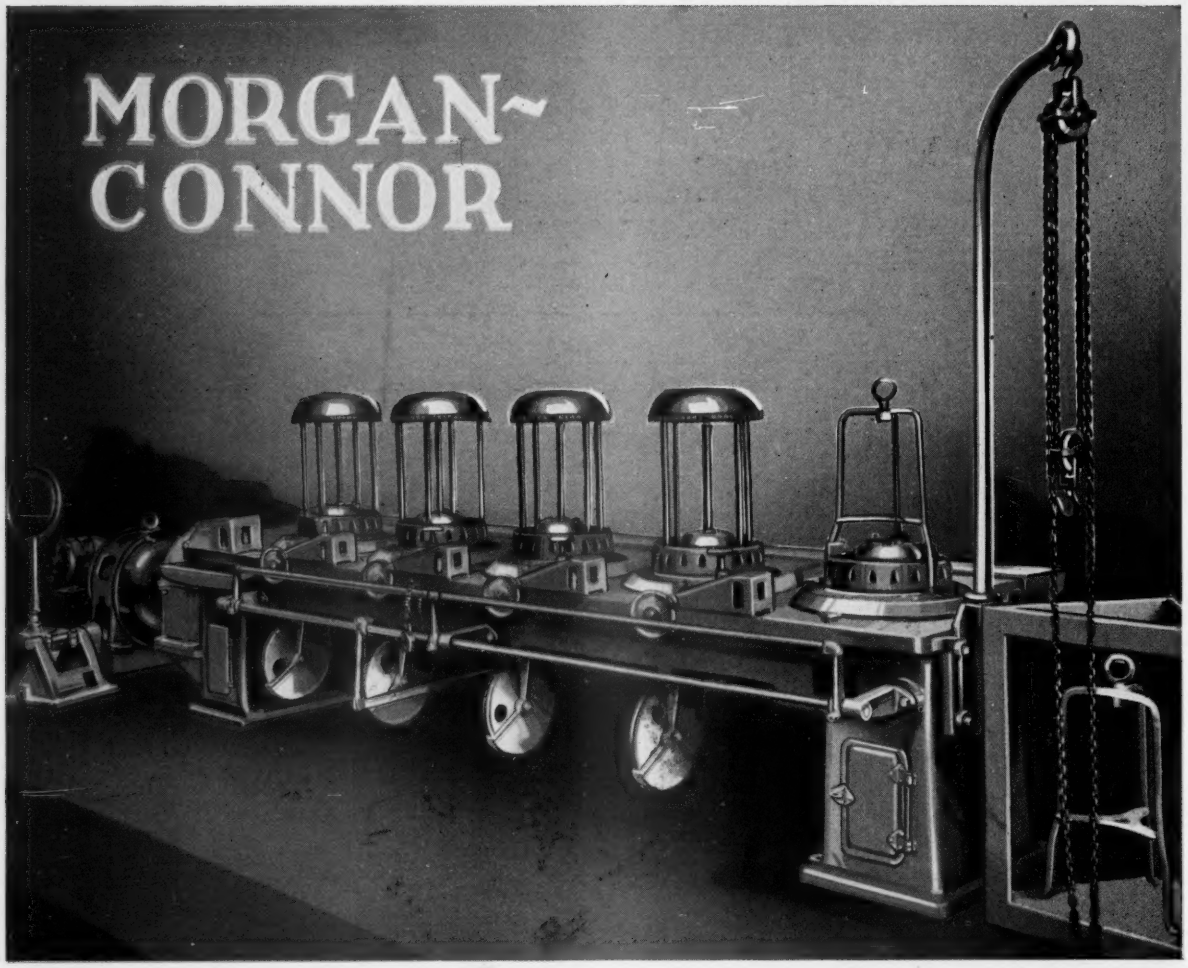

STRANDING HEAD TH 7-4
(450 RPM WITH 25-16"x 8" SPOOLS)
FULL WIDTH OF SLAB FOR THREADING, NOT INTERRUPTED BY SPIDER LEGS
3- SOLENOID BRAKES
7/8" THICK STEEL ROTOR BODY WITH STEEL SPIDERS AND STEEL CRADLES
"TEXTOLITE" SUPPORT ROLLERS IN CONFINED SLIDE
OPEN END WITH CONICAL SPRING FERRULE GUIDES
BEAM BOX STIFFENERS
GUARD RAILS
ELECTRIC STOP
SINGLE SPIDER FACILITATES THREADING AND REDUCES WINDAGE NOISES
THE WATSON MACHINE COMPANY
PATERSON, NEW JERSEY.
W-645

These machines are built standard by us in spool sizes of 25, 50, 100, 250 and 500 pounds; in 7, 12, 19 and 25-spool rotors.

Balanced Steel Rotor Body, with Steel Cradles and Spiders, Improved Threading and Guide Arrangements, with Textolite Support Rollers, are some of the main features.

We solicit your inquiries.

ELECTRICAL WIRE AND CABLE
WIRE ROPE and CORDAGE MACHINERY



This machine, one of several types and sizes of Morgan-Connor Wire Machines, will be operated at the Cleveland show.

It works from No. 5 gauge rod in basic and bessemer steel, and is at its best in sizes between 12½ and 16 gauge.

Output per man, which of course varies with finishing size and with bundle weight, will range from 20,000 to 7,000 lbs. per shift.

Air-cooling of blocks and wire allows the machine to draw rope and spring wire without developing enough heat to affect physical properties.

Finishing speeds range from 650 to 850 f. p. m. for the low carbon products, and 350 to 500 for high carbon.

MORGAN CONSTRUCTION CO., Worcester, Mass.

Sole licensee for Morgan-Connor Wire Machines in Europe

MALMEDIE & COMPANY

Maschinenfabrik Aktiengesellschaft **Dusseldorf, Germany**

MORGAN
WORCESTER

ENGINEERS AND MANUFACTURERS